

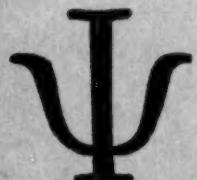
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Anne Roe

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Psychological Monographs: General and Applied

A Psychological Study of Eminent Psychologists and Anthropologists, and a Comparison with Biological and Physical Scientists¹

Anne Roe
New York, N.Y.

I. INTRODUCTION

This is the third and last monograph in a series of clinical studies of research scientists. The series of studies was designed to investigate the existence of relationships between life history, intellectual functions or personality characteristics, and the selection and pursuit of a particular science as a profession. This has been the first series of its kind in this field, and hence the major approach has had to be observational and diffuse. In so complex a problem, the first need is to get some idea of the nature of the relationships, if any exist, the points at which a direct attack can be made, and the sort of tools to use. It was felt that no existent personality theory was sufficiently developed, or generally suitable for the derivation of hypotheses in advance. Now that extensive observations have been made in this specific field, for this specific purpose, it is possible to set up a number of hypotheses concerning these relationships which can be checked directly in future work.

The subjects of the study are men who were selected for their eminence in research, as judged by their peers. The data comprise verbatim life histories, discussion of the work of the men, and

results of three tests, a Verbal-Spatial-Mathematical Test, the Thematic Apperception Test, and the Rorschach. In addition there were obtained, for comparison with these groups of eminent men, group Rorschachs of members of university faculties in the same fields.

The rationale of this approach is discussed in the first monograph, which presented the results of the study of biologists (21). The second monograph (22) is a similar study of physical scientists. This monograph reports the results of the study of psychologists and anthropologists, and a comparison of all of the groups. A short paper analyzed the interrelations of the tests of individual biologists (17), and another analyzed test interrelations for the total group of scientists (20). A separate paper on the scientists' use of imagery has appeared (19), and the group Rorschach studies have been reported in full detail in four papers (16, 18, 23, 24).

It seems almost impossible to formulate an adequate expression of appreciation to the subjects who have served in all of these studies. Their gifts, not only of time and effort, but of personal revelation, have resulted in data unique in psychological annals. It is with profound realization of the extraordinary privilege it has been to gather these data, and with a deep sense of obligation that I have attempted to organize the material for others.

For obvious reasons the names of the subjects have been withheld in these publications, and although many of them are recognizable from their histories, the test data cannot be related to these. Present eminence is not a sure criterion of future eminence, but it is evident that the clinical psychological records of these men would be of extraordinary interest to biographers. With the consent of the subjects, arrangements have been made to leave the full accounts to the library of the American Philosophical Society, where they will be available to research workers in due course.

¹ This research was supported by a grant from the National Institute of Mental Health, of the U. S. Public Health Service. Publication of this monograph was made possible by a grant from the Wenner-Gren Foundation.

II. SELECTION OF THE SAMPLE

The sample restrictions imposed in the previous studies were also observed in this, so that the subjects are all men, under 61 years of age, American born, and currently engaged in active research. The preliminary list of 94 psychologists was constructed with the aid of Dr. E. G. Boring and Dr. David Shakow. A few other names were added by the raters (E. G. Boring, E. R. Hilgard, D. B. Lindsley, J. W. Macfarlane, D. Shakow, and L. M. Terman), and the men were ranked on the basis of the combined ratings. The raters were in close agreement for the experimental psychologists, but agreement was very poor for all of the others, with no close correspondence between fields of rater and subject. This would seem to reflect a general confusion over standards for research that is not strictly experimental in character. In the final group there are, in broad classification, 10 experimentalists (comparative, learning theory, sensory experimentation, etc.) and 4 whose major fields lie in clinical, social, and developmental psychology, and testing. Three experimentalists refused, one because of serious illness, and one of the others could not be included when illness made it impossible to arrange for the inter-

views.

The original list of anthropologists, constructed with the help of Dr. Robert Lowie, included 82 men. The raters were A. V. Kidder, A. L. Kroeber, R. H. Lowie, A. H. Schultz, and C. F. Voegelin. Of the 13 men selected on this basis, one was out of the country, 3 refused, 1 was ill, and the other 8 are included in the study. There are two physical anthropologists, two archeologists, and four cultural anthropologists.

Although the data for psychologists and anthropologists are presented separately, these groups are combined for comparison with previous studies and together referred to as the social scientists. The term is not very satisfactory, particularly for experimental psychologists, but is probably better than devising a new rubric.

Excluding from each group those who were unable to cooperate because of illness or geographical location, the percentages of refusals were: biologists, 13%; physicists, 27%; social scientists, 22%. The higher rate of refusals among the physical scientists is, I believe, in considerable measure due to their heavier schedules.

III. DESCRIPTION OF THE GROUP

The psychologists have an average age of 46.7, the anthropologists 49.4; for all social scientists the average age is 47.7. The physicists averaged 44.7 years and the biologists 51.2.

FAMILY BACKGROUNDS

Enough data were gathered on the families of each subject to give some idea of the general socioeconomic position. No two psychologists were born in the

same state, but four came from the East, six from the Midwest, and three from the West. Four of the anthropologists were born in the East, three in the Midwest, and one in the West.

Occupation and education of the fathers of the subgroups are given in Table 1. Half of the psychologists and three of the anthropologists had professional fathers. Only 4 of the 14 psychologists came from families with rather

TABLE 1
OCCUPATIONS AND EDUCATION OF FATHERS

Occupation of Father	No. of Fathers of		Education of Father	No. of Fathers of	
	Psychologists	Anthropologists		Psychologists	Anthropologists
Physician.....	2	0	Elementary.....	4	1
Engineer.....	2	0	High school.....	0	3
College teaching.....	2	0	Some college.....	4	2
Lawyer.....	1	3	College graduate.....	5	2
Businessman:			Unknown.....	1	0
Own.....	2	4			
Clerk, agent.....	2	1			
Skilled labor.....	1	0			
Farmer.....	2	0			

good incomes, but 7 of the 8 anthropologists came from families that were well-to-do. Incidence of professional fathers in the other groups was 45% for the biologists and 73% for the physicists (experimentalists 50%; theorists 84%).

hall (5) also remarked on the high incidence of first-born in their sample of 855 scientists. For their group it was possible to check incidence of first-born in each family size from 2 to 7 and in all of them it proved to be greater than chance.

TABLE 2
NUMBER OF CHILDREN IN PARENTAL FAMILY AND BIRTH ORDER OF SUBJECTS

No. of Children, Including Subjects	No. of Subjects		Position in Family	No. of Subjects		
	Psych.	Anthro.		Psych.	Anthro.	All Scientists
1	3	3	1	6	5	39
2	1	2	2	3	2	13
3	5	2	3	2	0	3
4	4	0	4	3	0	3
5	0	0	5	0	0	2
6	1	1	6	0	1	2
Average.....	3.0	2.4	7	0	0	2
Average.....	2.8					

Number of children in the parental family and birth order of these subjects are given in Table 2. The distributions are similar to those for the biologists and physicists, and birth order for the total group of 64 scientists is also given. Comparison of the observed number of first-born with the calculated expected number shows the incidence of the first-born in these groups to be reliably greater than chance ($p < .01$).² Cattell and Brim-

Of the 25 scientists in my group who were not first-born, 5 are oldest sons, and 2 of the second-born were effectively the oldest during their childhoods because of the death of older sibs, one at birth, one at age 2. Complete data are not

born has a binomial distribution with mean $np = n(1/s)$ and variance $npq = n(1/s)(s - 1/s)$. When we add number of first-born for families of different size, the expected number is equal to the sum of expected numbers and since different families are independent, the variance of the sum is equal to the sum of the variances. The mean and the standard error of the total first-born will be approximately normally distributed if the total number of cases is large.

²I am indebted to Dr. Howard Levene for these calculations. His method is as follows: For families of size s , and n cases, the number of first-

TABLE 3
AGE AT MARRIAGE AND NUMBER OF CHILDREN

Age at Marriage	No. of Subjects		No. of Children	No. of Subjects	
	Psych.	Anthro.		Psych.	Anthro.
33	1	0	4	1	1
32	1	0	3	1	1
31	0	1	2	6	2
30	1	0	1	4	2
29	0	0	0	2	2
28	1	1			
27	3	1			
26	2	1			
25	1	1			
24	1	0			
23	2	2			
22	0	0			
21	0	1			
20	1	0			
Average.....	26.5	26.1			

available for 3, but for the others the average number of years between the subject and his next older brother was 5. The possible significance of this will be discussed later.

MARITAL STATUS

All of these men are married and most of them have children. Data are given in Table 3. Average age at marriage of all three groups of scientists is rather late, which is doubtless in part connected with the long educational histories. The social scientists, however, differ greatly from the others in the permanence of their marriages. Among the biologists, there have been three divorces (15%); among the physicists, one (5%); but five of the psychologists (36%) and four of the anthropologists (50%) have been divorced, and of these several have been divorced more than once.

That the psychologists and anthropologists have a smaller average number of children than the other scientists may be related to the difficult marital histories, but the differences are slight. The sex ratios of the children are quite different in the different groups of scientists but

this is probably chance: daughters are much more numerous for the physicists, sons for the biologists; for the social scientists, the difference is slight.

COLLEGE AND GRADUATE SCHOOL HISTORIES

Ages at which these subjects completed various stages of their formal training are given in Table 4. The averages are

TABLE 4
AGE AT RECEIVING COLLEGE DEGREES

Age at Receiving	B.A. or B.S.		Earned Sc.D. or Ph.D.	
	Psych.	Anthro.	Psych.	Anthro.
32	0	0	0	1
31	0	0	0	3
30	0	0	1	0
29	0	0	2	1
28	0	0	0	0
27	0	0	2	1
26	0	0	2	0
25	1	0	1	0
24	1	1	5	2
23	1	2	1	0
22	1	2	0	0
21	6	3	0	0
20	4	0	0	0
Average age...	21.4	22.1	25.8	28.6

Psychologists: 9 took M.A., average age 23.8 years.
Anthropologists: 7 took M.A.; average age 24.4 years.

about the same as those for the biologists, but about a year higher than those for the physicists. More of this group than of the others took Master's degrees.

Five psychologists and four anthropologists received their Ph.D.'s from Harvard, two psychologists from Yale, and one of each from Chicago. The others all attended different institutions.

PROFESSIONAL HISTORY

Since completing their formal schooling the members of this group have moved about relatively little. The num-

ber of institutions with which they have been connected professionally is given in Table 5. The distributions and means are similar to those of the earlier groups, with the slightly higher mean for the biologists probably reflecting their higher average age.

Nine of the social scientists had postdoctoral fellowships—five National Research Council, one Social Science Research Council, one Guggenheim, and two others. Most of the anthropologists have had grants for field work.

Among the psychologists there have been no major changes in field of work although several have shifted gradually until they are now rather far from where they started. There have been greater changes among the anthropologists. These seem to have been due to contact with particular persons, or to the specific nature of the jobs which were available. Nevertheless, the general pattern is of being able to control to a fairly considerable extent the nature of the research undertaken.

TABLE 5
NUMBER OF INSTITUTIONS WITH WHICH SUBJECT HAS BEEN CONNECTED SINCE DOCTORATE

No. of Institutions	No. of Subjects		
	Psych.	Anthro.	Both
4	2	2	4
3	4	0	4
2	5	2	7
1	3	4	7
Av. no. of institutions.....	2.4	2.0	2.2

IV. EARLY HISTORY RELEVANT TO OCCUPATIONAL CHOICE

One of the striking differences between the social scientists and the others is the amount of material which was spontaneously offered in the interview. In part this may be due to the greater understanding among this group of the general problem and the relevance of details of personal history, but in perhaps larger part it is a reflection of their greater ease of verbalization. This means, among other things, that the life histories for this group must be subjected to considerably more cutting than was necessary for the earlier groups.

The interviews were very little structured. The subject was asked at the outset for information on general family

background, early family and school life, and everything he could remember that related to his choice of vocation. I interrupted as little as possible, usually only to clarify a point or to recall him to pertinent material. Later I asked specifically for information on health, religion, and present leisure interests, as well as on use of imagery. Sometimes the projective material suggested questions for later intervals, but under these circumstances deep probing is impossible. The combination of projective material and life histories recorded verbatim offers excellent cross checks.

The histories which follow are first discussed separately for the psychologists

and the anthropologists. They are arranged in a chance sequence which bears no relation to the code numbers assigned to each man for presentation of the test data.

THE PSYCHOLOGISTS

A. "My father was the ideal of a country doctor and he took me around with him on visits to his patients. He was on the earthy side. Mother was brought up in a highly charged religious culture but she broadened later."

"In grade school I wasn't a distinguished student. I didn't like school but it wasn't a particular problem. I was just doing what I was supposed to do. I suffered agonies on the playground because I couldn't chin myself and things like that; I think it was more my constitutional type than ill health. I started something that has been a life pattern, to find out what I could do and do it well. I was very clever at sidestepping from childhood on. I surrounded myself with those I could do business with and I avoided others. I have always avoided fights and competition but I always had playmates. I wasn't elected to class office but I did become editor of the school paper."

"In high school I had a girl friend and was a rather happy adolescent provided I could keep out of competition. I made my own world, I always have. The odd thing about me was I had no aspirations at that time. I felt driven to do the damn best I could but I don't think it was because of aspiration or ambition or egotism, but I was haunted, driven. Even now I can't take a vacation without taking work with me."

"I went to college largely because of a brother who was there. My college experience was just a new world. There wasn't any world until then hardly for me. I just took things for granted. Intellectually, college was a marvelous opportunity, but this was not only intellectual. Another element that played a very large part was the experience in social service. I had a boys' club and became much interested in social work. It seemed to release in me an idealism I hadn't been aware of before. I got a tremendous kick out of doing good and that interest always was a close second to my studies. I studied hard, first because I always felt driven and partly also because Father had given me to understand that I would have to have a scholarship every year, and I did. If I had vocational ideas through college they were in the direction of social work rather than science. I didn't know what I was going to do. It was funny that I wasn't worried about the future."

"I taught abroad for a year but never thought of anything beyond that. Then the family insisted that I come home and I got a graduate

scholarship. My undergraduate major was called economics but I think I went into psychology to find out what one of my professors was talking about. He intrigued me. There was no doubt that I had an authentic learning experience, although he was totally unintelligible to me. In two years I had my Ph.D. I was pretty immature and the department was really very weak as I see it now. I went abroad again on a fellowship. It took me some months to find out what was going on. But I got oriented a bit and I began to learn what to read in the new German psychology to which I was exposed. Having to make my own way (intellectually) meant a lot. I don't like guidance. I don't like spoon-feeding. I don't like pampering. It's much better to be thrown on your own."

B. "My father was the son of a businessman in upper New York State. He didn't have to earn a living or do any serious work until he was over thirty. He had studied voice abroad and then he took a job as singing teacher in a small college. My mother went to a ladies' seminary and taught dramatics in public school."

"I went from kindergarten and through junior high school in a laboratory school associated with the college and I did pretty well all the way through there. Then I went down to the public schools for the last two years of high school and my marks fell apart. The teaching was mediocre and I was less at home. The time coincided with the development of heterosexual interests and I was much more interested in going out with the girls than I was in studying. I had no intellectual interests. As a boy the thing I liked was being out in the woods. I was interested in reading. I read a lot but it was mostly Edgar Rice Burroughs and that sort of thing."

"I started in a teachers' college because we were living right there. I didn't have any ambitions. For a while I was interested in journalism. It was just taken for granted that I would go to college. Father had graduated and mother had the equivalent of a college education. But after the first two years I said to hell with it. I'm not going on with college. It was just a source of tension and stress to me. I went to work on a railroad construction gang and I damn near killed myself to prove that I was a man. By fall I decided that earning a living with your back muscles wasn't so good, and I went back to normal school. That's when my academic record improved. I took an English major, probably because of deficiencies. I disliked math and that threw out the sciences immediately. I wasn't inclined toward art and music was out because of the family situation. I guess I had secondary school teaching in mind. I seemed to have no alternative ideas, and it

was a way to earn a living. I enjoyed my teacher training and thought I did it well. They gave us a chance to work out our own plans and I really enjoyed that.

"Then this is the way I got interested in psychology. A fellow who had just gotten his Ph.D. came into the psychology department, and I first saw the light as far as my personal problem was concerned. I realized that I wasn't deviate and that there was some hope for me. Then he became a father substitute. He let me go to his home and would talk to me on an equal level and he got me very excited about scientific objectivity. I got my B.A. in a depression year and there were practically no jobs. At the same time they had just started giving an M.A. and he offered me a fellowship which was enough to pay Mother for board and room and keep up my self-respect. So I stayed and got an M.A. and I was more and more interested. I had been reading Lashley, some of which I still don't understand and much of which I didn't understand then. I did an animal study all by myself and no one bossed me around or even helped me. By that time I decided I wanted to go into professional psychology.

"I taught high school for a year and then went back with an assistantship at another university. I did a very hard job on my thesis. I literally lived in the laboratory for the better part of the year. The professor didn't give me any encouragement but indicated indirectly that he had confidence in me. He was just the sort of guy who would leave you alone but you could have contact if you were persistent enough about it. And he was an eminent man and that made a lot of difference to me."

C. "Father was a construction engineer and finally became very prosperous. He had a good mind and a college education but he was most certainly not an intellectual, and tended on the whole to scorn professors and such. Mother went to college but I can't remember if she finished. Any expression of her intellectual side has always been very much restricted by her strong primitive religious background.

"I learned to read long before I went to school, but I have really no idea how. It's characteristic of the family situation that the first book I read was a fat Bible story book. Reading was pretty nearly all my life in the early school days, and writing. I liked all types of school work; looking back on it I liked them too much. I was a shy youngster. I can't believe I had any social adjustment in the group. I had enough companions at home to make it unnecessary. In our home, reading was only sort of all right; if you had done your chores and there was nothing else to do it was okay to read. About the time I was ready to start high school my parents

bought a farm and I had to transfer several times (because of transportation difficulties). I was practically always the top of my grade in most everything. My social life was unbelievably nil. Dancing, card playing, and movies were verboten, and even carbonated beverages weren't quite right.

"There was never any question about going to college. We went to the state university where father had gone and started living at the Y dormitory. I knew what I wanted to do. I'd always been interested in nature. It was about the time of Gene Stratton-Porter and her books about moths of the Limberlost figured very much. I started reading about moths and finding caterpillars and feeding them and I got to be quite an authority on night flying things. Then father wanted the farm run scientifically and he had some of the agricultural people come down from the state university. That began to fascinate me. I realize now that what intrigued me was the scientific part. Agricultural work is good experimental work and I took that in. So I registered in agriculture and had every idea that what I was going to be was a farmer.

"Being of a somewhat emotional and sensitive sort, religious conferences at the Y hit me pretty deep and I don't know whether gradually or suddenly I began thinking of the ministry. I realized a broad background would be a good thing and I changed my major to history. And then, too, the exploring, the scientific, the scholarly side appealed to me more and more.

"Then I was able to attend a conference abroad. That was an education, my gosh. That stretched my thinking enormously and pretty well disabused me of a lot of the narrow religious ideas I had. It determined me to go to some liberal seminary and it strengthened my decision to go into the ministry.

"The motivation was really a service motivation. Quite a strong one, I should say, and on a fairly abstract sort of level in a sense. I found the seminary an extremely stimulating place. They really believed in freedom of thought and inquiry and there was a bright group of students and in no time at all we were teaching ourselves. In courses in religious education we got a good deal of what really would be clinical psychology. That appealed to me very much and sort of shifted my focus to religious education. On the intellectual and philosophical side there was a steady growth in questioning on the part of the whole group of us. I began to take courses in psychology and by the end of my second year I definitely decided on it. I was interested in child guidance work and the service motivation was definitely dominant.

"I changed to educational psychology and I got a fellowship in child guidance. It was a fairly tough year. At the university they were

rigidly objective, emotions didn't count and the Child Guidance Institute was everything from ultra-Freudian to statistical. That was very fruitful, that was awfully good training. That year I began to realize I have a facility for working with people. Then I went to another social agency that gave me a kind of chance I think not enough people get. I just got a snoot full of work. I wasn't particularly thinking about what to do next professionally, there was just so much work to do, so many children to see, so many agencies wanting help with children that I just got deeply immersed in the clinical function. I just learned how to work with kids. And there was none of what I feel has so often killed clinical psychologists, there was no one whom we had to be subservient to."

D. His parents came from abroad but were married here. His father made a rapid ascent in business, but died when the subject was in his early teens. He went to the public schools but had a good deal of illness and was left back.

"I went through school doing competently, never being very much engaged. It was never a really challenging kind of thing to do. I spent a lot of time in the woods and I did a lot of reading of very conventional things. After father's death we moved about a good deal. It was very confusing for the next few years. I went to about six different high schools until I was finished and there was always the problem of establishing myself. The critical problem of staying and getting a footing became more and more important to me. I began to develop some special ways of doing this.

"Then I ran on to the first teacher who really interested me, in a course in European history. I started reading in the field and I read outside of school and I became interested in working at maps. That course was the first real satisfaction I ever got in a course. It represented material which could be organized, you could make sense out of complexity. You could see elegant trends.

"I wanted to go to college. It was taken for granted that I would go and it was somehow assumed that I would take a pre-law course. I did for two years and I was very indifferent and uninterested. Meantime I was putting in a lot of time at writing. Not stories, but essays, trying to get my thoughts straight. Writing a lot to the college newspaper, for example, and one thing and another like that.

"At the end of my second year I took a course in psychology and the tremendous comprehension and dogma intrigued me and infuriated me. I was intrigued by the fact that he had tried to cover so much in one simple theory. I started thinking and I started reading. Then I suddenly realized that this was the stuff that interested me and in a curious kind of way, and the term

after that I decided to go ahead and find out more about it. I couldn't do anything by myself so I took some more courses. I felt a certain impotence.

"That was a period when the fever started developing. One of the professors took a group of us and he thought if we wanted to learn about things, the way to do it was to do research. My senior year I carried through some research. That really sent me. That was the thing that trapped me. After that there was no getting out. I tried anthropology and it infuriated me. I enjoyed it thoroughly, but I found that it just didn't satisfy me. That insofar as one could design anything elegant, it would be banal. At the same time all these things burst up together. I began to have some sense of what constitutes poetry. It was another world just opening up before me, and the same thing happened in music. All this in a period of a half year. I remember I decided that I wouldn't go home for Christmas that year. It was a kind of painful thing but I just could not communicate with the family so I didn't go.

"By this time I knew for sure that I wanted to be in psychology but I didn't know what I wanted to be in psychology. I did some research projects and it seemed to me all the wonderful fiery dogmas of the period were all wrong. That first year of graduate work was heavenly. Then I developed a new, more specific kind of promiscuity. I spent a summer working on operative techniques after devouring Lashley's papers. I read enormously in physiology and in anthropology and I started working on field problems with monkeys. I didn't finish because that spring I somehow had the feeling that that was getting to be too much of the same sort of thing and that the field of physiology was not quite all I wanted. I read Allport's *Personality* and Boring's *History* and I decided by gosh I'd go on."

E. "I was born in a town of about 5,000 and we lived under very restricted financial circumstances. I wandered through grade school, but in high school I was the top of the boys. I expected to become a teacher. Socially I was very restricted. My father was opposed to our learning to dance. I didn't date in high school although I would have liked to. I was small and the group I went around with was younger, I found I could play football with them. I was quiet and never caused any trouble. I did my lessons, my teachers liked me. My oldest brother thought I was too mild so he taught me to box. My brothers were very close. Even in college my closest friend was my next older brother. We lived close enough to poverty, and always in the family there was a great confidence in our complete intellectual superiority. There was a very

strong intellectual emphasis on this kind of thing.

"I would say I did a moderate amount of reading. I wasn't a voracious reader. I didn't have any particular intellectual interests in high school. I think college was assumed, and it was taken for granted I would go to the one in my home town. Then an older brother went away to college and my aunts financed my going. The one thing that surprised me was that I wasn't homesick. I had expected to be. There I developed my first real intellectual interests. I had no concept of studying. It wasn't until I reached my second year that I found people studied for exams and it was a shock. The first thing I found I liked was biology but I was revolted by dissection. Undoubtedly I was just drifting. I gave my major as English because my brother did. I liked history very much—I liked memorizing dates, facts, people, when I found out you were supposed to do it. When I took psychology I pretty well decided to become a psychologist. It was interesting like biology and as far as I could see you didn't have to dissect. I was as interested in the physical sciences as in the psychological but I had an emotional block against the mechanical aspects. The chairman of the department thought I had the ability to go into graduate work and the last year I was given a teaching assistantship; I had had a job running rats on an hourly basis. I avoided advanced work in statistics, let's be honest, I was scared of it. I don't think I was unusually inept but I lacked the blind confidence."

F. "As far back as I know both my parents' families were farmers with no professional people among close relatives. My parents had only a country school education. Father was quite an intelligent man and did quite a bit of reading. My home was favorably oriented, if not strongly directed. I started school on my seventh birthday but I'm sure I was ready before, and within a year I was in the third grade reading. School was easy and I was the first in the community to go to high school. I liked all subjects in high school, particularly the sciences, and I did very well in all. In the senior year I took on the normal training course and read James' *Principles* and *Briefer Course*. It was in that course that I first got acquainted with psychology as a subject but I'm sure I was interested in it before that because as a child I made observations on perception which I later found out were psychological. I made observations on depth perception and I read about hypnotism as a child.

"Afternoons during high school I spent mainly in reading. I was never active in athletics. I don't think I had much aptitude for it. I think I was discouraged in early childhood. My brother being six years older was much stronger and he

and his friends dominated the scene so that I couldn't compete. I was not interested in gadgets, although we had a good tool shop and I had plenty of opportunities to make things. I have never liked laboratory apparatus.

"I stayed at home for a year, and then taught grade school for two years before I went to the university. My teachers encouraged me to go and my friends were going. I don't think I had very well-defined objectives. The first objective was when I took a normal training course with the idea of teaching. When I started teaching it was with the idea of getting enough money to go on to college. My parents were favorable and helped me financially. I was planning then to be a psychologist, but I hadn't much idea of what I would do. I guess I knew that most of them were teaching.

"My course was interrupted by the war and more teaching and when I went back it was with the idea of being a chemist, but also I started psychology. I did sufficiently distinguished work that I was offered a job as assistant and this changed my vocational plans completely. That year the clinic was left without anyone in charge and I took over. I had just had one course in Binet but I dug in and read everything I could get hold of and I learned to give Pintner-Paterson and other tests. I learned a lot of psychology that way. I was offered an assistantship elsewhere for my Ph.D. It was a course in psychophysics that impressed me the most, the exactness and rigor. That is another reason for the mathematical twist. It appealed to me, it's neat and precise, and probably is the chief source of the direction I have taken since then."

G. "My grandparents on both sides were early pioneers in the West. Father ran a wholesale electrical jobbing house, and I was just about finishing high school when he was killed in an accident. Mother died the same year, just before Father. I had always worked in the business with him and I carried it on and then sold it after about six months.

"I had to repeat the first grade in school. I was pretty indifferent as a scholar. I've decided now I couldn't read in those days. But I think it's fair to say that I stood successively higher in the group from the first year when I flunked out to the year I got my Ph.D. I played outside after school until I was in high school and then I worked, helped out in deliveries and then played around with the kids in the neighborhood at nights. We used to roam the streets and break into the corner grocery store and steal things, like cars. I never got sent to the reform school, although I've been in the juvenile court for jerking trolleys off the cars. It was mostly good wholesome fun, although occasionally we were in trouble.

"I made a pretty good record in high school. I worked some on the school paper and I was on the debating team. Church was a very important part of our lives.

(After a period abroad he returned home and started to college, the expected thing in my community.) "I never took anything I was supposed to. Mainly I was taking many different courses. The tallest and broadest of the subjects were the ones that interested me. I had a good general education if poking into all sorts of subjects is a good general education. I started in law but soon talked myself out of that. About that time I looked into what this medical school deal was about and I was able to predict what room I'd be in at what time in the morning four years hence, and I couldn't face that much determination of my future. In my spare time as an undergraduate I began to hang around the psychology department a bit. I used to go up to the professor's house for seminars and that seemed kind of interesting. I read Watson. When I decided not to go to medical school I thought maybe I'd study psychology. Of course there was hardly anything I didn't want to be. It was a process of elimination. I talked to people and I remember one of them told me, 'Well, you go on and become an experimentalist and you can always have a good job.' I think I was helped a little towards this decision by taking the Strong which was coming out about then. I got myself scored on a few things and I got A in math and A in psychology and B's in law, medicine, banking and things like that, and way down in salesmanship, and that agreed with my introspection.

"I came East without bothering to get admitted in advance and shopped around among courses. I took a course in psychology and said I'd like to do an experiment. I was sent up to the attic where I set up an experiment. Then I had a great insight. I discovered that if you varied one thing, another one also varied. Oh! what an experience that was. I fiddled around and I had a bright idea how to compensate for this effect and I could plot some curves. Then I discovered about prelims and I had 100 days to prepare in, and then I was a psychologist."

H. "My father was a clerk in his father's general merchandise business. He had had some ambition to be a doctor but his father would not let him, with the result that he had ambitions for me to become a doctor. He was a rather good-tempered, relatively unambitious man, interested in politics and a definite extrovert. Mother was an extremely ambitious woman, and a very dissatisfied one. She undoubtedly had the feeling that she was better than the townspeople.

"I was able to read when I was four, and started school then. Then we moved and for

two years my schooling was irregular but after that I was pushed ahead. Five nights a week at 8 o'clock I was put in a Morris chair with a board across the arms and I worked on my lessons and recited them to my mother until I was letter perfect. I was 12 when I went to high school and I graduated at 15. This was not an accredited high school and I had then to do a year of prep work. I was handicapped in sports but had not much interest in them. I spent all the time I could reading mother's considerable collection of books, mostly fiction. My only other interests were in boats and pets. Mother bought a parrot when I was two years old and we learned our alphabet together, and we were rivals in the family.

"I think I was an extremely passive, unambitious, and very obedient child. I was never punished by my father but was always in fear of him. I didn't discover what it was to have liberty until I got away from home. I was kept in long curls and short trousers to the point of making me ridiculous. This was because of mother's ambition to prove my precocity.

"I hated high school, the regularity. I have never been able to do anything seven days a week. I pretended to have headaches in order to miss school and I have been missing school ever since.

"I went to college in accordance with father's plans for me. I made very few friends and spent much time reading alone. I learned to smoke and I learned what it was not to have authority over me. I was disoriented for a long time until I found a library. For a while I had a chum and then in my senior year I was left again without close personal contacts. At one time I realized I was doing very little talking so I kept track of it and I found that in three days I had said twenty-four words. I took no part in class activities, I wasn't rushed for a fraternity. I had \$28 a month to live on and I managed to make that go.

"I had no ideas about a vocation except some fantasies about civil engineering which did not meet with my parents' approval. It was decided I should finish my bachelor's work before I took any special training. I found I liked zoology and then concentrated on that, and I got an assistant's job in the laboratory. From that time on I lived in the laboratory. I developed quite a fixation on the teacher who became to me the ideal scientist. His method of instruction was to say to me 'You will find some sheep brains in the laboratory. Go get them and work up a course in the laboratory for the course in neurology.' There was a good deal of prestige value in this job. I became an authority among fellow students on biology, including the biology of sex in which I knew nothing directly. My only outside interest was in music and this has been a

very important part of my life.

"I went to graduate school with a teaching fellowship in biology and I had no idea of what I was going to do. I was just living in the present, there was no future. I had a purely passive attitude but with this love of the things I was doing in zoology, and no idea of the possibility of a career in zoology. I have never looked ahead towards goals. It has always been, here are problems to be solved. I eventually majored in bacteriology but with psychology and psychiatry as minors. After my master's degree, I became an assistant to one of the psychologists to whom I became very attached, and I worked with him very closely. When I think about how things have gone it seems to me that the little success here and there seems to be a determining factor. That and personal contacts. I did some clinical work for a while but hated it and soon got back to animals. I've never been interested in people."

I. "My father was a physician and my own thought was of becoming a physician and taking up in my father's footsteps. This was a common practice. I was pretty timid about the problem of making a living. I had a feeling of being bright but impractical and this seemed a secure pattern. Mother always talked about wanting me to be a lawyer or judge, but I think it was her notion of what profession had the most prestige. We had a sort of *noblesse oblige* attitude toward democracy. We had a feeling of being somebody in our small town. I was invited to the right parties and all that. We were very good people. Father died in the war when I was fourteen. It wasn't a particularly sad experience in some ways for me, but it was sobering because I took a sense of responsibility, being the man in the house. But from then on the medical business seemed to be out of the question.

"In grade school and in high school things came easily for me. I skipped a good deal in the grades. I think this made me a little anti-intellectual in a sense. I wanted to show I didn't ever study or anything. I didn't read much, either, and I didn't do much with gadgets. I had some kind of psychological advice in high school, from two people who were sufficiently contradictory in their appraisal of me that it was a little reassuring in a way. The principal told me I was bright but timid and would probably never be comfortable with people so I should go into scientific work. So I decided to go into chemical engineering. It was kind of a romantic thing and it sounded a little hard-boiled. The assistant principal insisted I take up debating because I was sure to be a public figure. I was successful at this; in spite of timidity I had a good platform manner.

"I took my bachelor's degree in chemical

engineering. I did well in my college work but I never really got very much identified with chemistry. I think the reason I stuck with it was because it was easy for me. I wasn't satisfied with it but in the midst of college life it was not so important. Other things, fraternity life and so on, were more important. I was very active on the campus, especially with campus publications and YMCA work.

"I didn't wrestle much with vocational goals until my senior year. There was pressure from the Y to go on with that kind of work because I was pretty successful. I was emotionally involved in these problems but hesitated because of the religious angle. My attitudes were scientific. The supernatural angle didn't appeal to me but the social did. The thought of an advanced degree never entered my mind, although my chemistry record brought me offers of financial aid. But I wasn't very successful in scouting around for work, which I took as personal rebuffs, and the places I did see where you could get jobs in chemistry were uninteresting and in places that smelled.

"So I took an offer to run the employment office at school and work as a Y secretary. It was a curiously reassuring experience that I could become a Y secretary without being threatened (in prestige). I was getting a little organized in a way. I received a grant to study at a divinity school and I had a thoroughly good time for a year. I was just exploring. I just absorbed it. I did a lot of reading in poetry and archeology, along with the standard course in religious education.

"In the meantime I had a job on the side in the student employment office, having some attraction to vocational guidance. I suspect that no one with very clear vocational plans would go into vocational guidance. One of my friends was writing a book and he needed some statistical work done on it, and I got Garrett out of the library and did correlations the next day. That was kind of interesting and I decided at that point to give psychology a try. I had only had a half course during my senior year. All I remember is being puzzled at the assistants and wondering why any one would ever choose that for a profession. I presently found myself in the psychology department there. I think by this time I was somewhat returning to the satisfactions of scientific work; I think the notion of apparatus appealed to me and of mathematical work. I liked my fling in the other world but I liked those correlations."

J. "My father was a lawyer with only a law school education and was the author of a book on compensation law. Mother had been a stenographer and secretary. They both grew up in the small town where we all lived until I was

through high school. We all went to the same high school and father and mother and I all finished second in our classes. I simply went through the town school from first grade through high school. One of the teachers had a great influence on me. I had her for twelve years in different subjects. She read 'advanced' books like *Lord Jim* and told me about them. She was the only cultural influence in town.

"I wasn't much of a person for sports. I went through a phase of living out in the country, and later I played tennis a good deal, generally with older people. I learned to play the piano at seven and later played other instruments in band and orchestra. I read a good deal. Once when we were reading *As You Like It*, father casually referred to the Baconian theory and next day in class I said in a very smart-alecky way, 'Shakespeare didn't even write this.' The teacher said 'You don't know what you're talking about.' So that challenged me and I went down to the library and looked it up. I read a lot—all the Bacon I could find—and I must somehow have gotten the stuff under my skin because I've been a staunch Baconian ever since. I understood it later. At the time, of course, much of it was way ahead of me. I was always writing, too, short stories, poems, essays. As a senior I got a job on the local paper.

"Father wanted me to be a lawyer and pointed out the advantages of being able to come into his office. I never liked the idea but I didn't openly rebel, and I had no vocational guidance information whatever. It was taken for granted I would go to college. I always assumed that everyone tried to better his condition and I was much shocked in my later years in college to find that this wasn't always so. Probably my father being a self-made man contributed to that.

"I wanted to be a writer, but supposed I would go into law because I could do nothing else. I majored in English and minored in Romance languages and I went to college full of real respect for learning and supposed everyone else was doing the same. It was a lousy college. It was the most unplanned kind of education you can imagine. I took courses because my frat brothers recommended them. I took a course in embryology and I did a lot of extra work in it, some original research. I made slides and I had the feel of science. By all odds the great side of my college career was in learning something about the art of living."

As a tutor in a professor's family he learned much about art and music and fine living. This intensified his interest in writing and he was also profoundly affected by favorable criticism of his work by a noted poet, and came to feel that law was impossible. After college he stayed for a year at home trying to write but was unable to get started.

"During that year at home I read a good deal, McCurdy, Watson, Pavlov, Loeb, Broad, Ogden, and Russell. I was much impressed with behaviorism as an approach. I had had no psychology in college. I took biology because science was required, and now I decided I would study psychology. I wasn't equipped for any other science and I was always interested in literature. I decided that literature wasn't an adequate method of tackling the problem of behavior. I went on to graduate school. I was highly motivated that first year. I used to work from six in the morning until nine at night. Every moment was accounted for. That first year I didn't see a movie, I didn't have a date. I couldn't stand that pace now at all, but I did catch up. I was amazed to find that no one in the department was a behaviorist. I thought nothing else was possible. Since there were no behaviorists there, I went over to biology pretty much where I could see some behavior being studied. You become a psychologist to find out how to have your own way. You want to know how people behave as they do and partly because you want to change them."

K. "Father was a purchasing agent, but was also clerk of the board of education in this country town and clerk of the village trustees, and was greatly respected throughout the area. Mother had been a nurse. I believe that both of my parents were quite influential in the development of character traits. Both were proud and sensitive and extremely kindly and accommodating to everyone. Ours was not a demonstrative family; there was very little outward manifestation of affection, but a strong and unwavering sense of loyalty and attachment was understood by all.

"Throughout school I participated in athletics of all kinds. We all did a lot of hunting and fishing and were all the time in the woods, traipsing around somewhere. Father often took me with him on visits to different quarries. I enjoyed school very much, both the athletic things as well as school itself. Until about my class there hadn't been people going away to school. I think the main reason I went to college was the high school principal who was also our coach and was a great influence on us. He also taught the science courses and I think probably I got some of my interest in science from his being coach and teacher. My parents were willing but concerned over finances. They thought of college as a means to a business career, and so I majored in commerce as well as in psychology. I had all kinds of jobs. I ate one meal a day, but I was not alone in that.

"I was very fortunate. I took psychology my first semester. The professor was dynamic and inspiring. During the first year we could take

the experimental lab and I had a good deal of interest right from the start. At the close of that year the professor's senior assistant was leaving and he offered me that job. I went on in psychology mainly because of the professor's influence. He became a kind of scientific father at that point. I was almost completely separated from my family as far as educational interests went and he would take me around wherever he went.

"I went on to graduate school with the vague idea of becoming a psychiatrist. Again I was fortunate in an inspiring teacher. I majored in clinical psychology and we attended staff meetings at the psychiatric hospital. I developed a tremendous interest in the physiological things. I think that's where my interest in psychiatry fell out, I felt I had a channel or avenue that was really my own. Those days were really very valuable ones for me, not so much because of the training there but because I caught the spirit and enthusiasm for research."

L. "My grandparents on both sides were small farmers, my father a skilled workman. When I went to school I had a lot of traumatic experiences. I had a hell of a time adjusting in kindergarten. But after the first year in grammar school I went on with not too much difficulty. I played with the kids after school. Mostly we played outdoors, although I occasionally did stay home and read. We played a good deal of baseball and there were some fights, as kids of course. I wasn't too aggressive but I got into fights. When I went to high school I didn't particularly get in with any group mostly because I worked a lot of the time. My family thought it developed character, it wasn't necessary. In my senior year I refused to work except Saturday and I graduated as first boy in the class.

"College had been projected, of course, from the time I was very young. I just accepted it. I guess I wanted it, I don't know. I signed up as a chemistry major. I guess it derived from father's interests. He had wanted me to try to get into a technical school but I didn't quite have the prerequisites. In college I took some part, not too successfully, in athletics, but what I enjoyed most was the Glee Club. And I was editor of the literary magazine.

"In my third year I began to wonder what I was getting out of all this business. I wished I had taken philosophy because I was concerned with problems of the soul and this bothered me, but there were no philosophy courses and so I took psychology. Although we were taught Titchener pretty much and although even then I didn't believe it (I thought all of this could be described in physiological processes) it seemed to make sense and I liked it. It gave an experimental approach to problems I was interested

in in philosophy and a better approach than sociology did. I decided to try to get all the psychology I could and though the experimental course was very tough I took it. When I was a senior I worked with a Ph.D. student on a laboratory problem. I thought this was really the stuff in the sense that this is serious as the experiments in experimental psychology were not, so I got quite a feeling of responsibility out of it.

"I went on to graduate work. The family didn't object. The professor left students to themselves not giving very much aid. I half liked it and it half irritated me. It developed a sort of anxiety in me. I would see some of the other people going ahead and getting something and here I was reading at random still. During my first year it wasn't much fun. I guess I worked a good deal alone. I spent the year studying mathematics and science generally. There was no emphasis on psychology. All of the students were individualists; there was little homogeneity of interests at all in the whole group."

M. "My father was an engineer and had a polytechnical training in Germany. He was killed in a hunting accident when I was a child. Mother took over his business, and from then on we lived in boarding houses, and I was left pretty much to myself.

"I was always a very poor student in all subjects except math, and I could do special problems, but I didn't do too well. I always just managed to get through. I spent a lot of time in my father's shop. I was a little pet around the place, and they let me do everything. I've always enjoyed working with my hands. I still would rather do that than eat.

"I spent a lot of time in athletics; I was in all the track events in high school and football and baseball. Father's plan for me had been a technical education in Germany so after high school I went there. Suddenly the world opened up, the world of literature and all the rest. There were bookshops on every corner. I read all of the Russians and then I read all the German literature and then I went back to English literature. I became very much interested in the theater. The first year I was sort of outside the picture and I was terribly lonesome and that gave me sort of a chance to look back and see what it was all about. After the life I had in high school where I had been in everything, president of the class, captain of the teams, and then going to this life where you didn't have to attend any courses. The second year I was elected to a sportsverein. I was there three years, until the war broke out. That brought about a general re-examination of what you wanted to do and I suddenly found that engineering did not interest me enough to consider it a life career. I didn't know really what I

wanted to do. I was interested in something that had to do with people and behavior in more general ways. As closely as I can remember it was a choice between economics and a diplomatic service career.

"I came back and went to college. One course in international diplomacy cured me of an interest in that, and I soon gave up economics courses, there was nothing I could hold to, it was all verbal. Then I got interested in Freud and early analytical work and I read everything in analysis. I had one course in animal behavior; this was my first contact in anything like that and I got an A. I knew then I wanted something in the form of psychology. I had read Watson, I was stimulated from the physiological angle. I got my B.A. and when I got out of the service I came directly here from the camp and started in. This was the best place I could have picked out. The professor said just go ahead and work, there will be no courses, just go ahead. So I went right on, on almost the same system I had in Germany. I made arrangements to dissect a stiff in anatomy, I just did it on my own and I did the same thing in physiology. I ran all the experiments on my own and then that was the extent of my formal education. Meanwhile I did a lot of psychological experiments. Actually so far as formal education goes I had very little. I just managed probably to be lucky and not to have been forced or unlucky. I've been able to go ahead in developing my own interests. I was a poor student, I could never have made the grade in any formal course.

"I had no idea of a career at this point, it was just something that was overwhelmingly interesting to me. My professor had a very important influence in my whole development, he was far and away the most widely-read man, the greatest scholar I had ever come into contact with. He had a great fund of information and high ideals and tolerance of all kinds of work. As the work developed, as I look back I have been stubborn and unpleasant because many times he tried to push me in another direction. He had little idea of what could be worked out experimentally. I got my degree in two years, and after I graduated I had a staff position. It was very exciting to have contact with the patients. It opened up all kinds of possibilities."

N. "My family background is both farm and fairly good upper-middle-class group. They had farm, mercantile and professional affiliations, medical and legal. My father is a very able, hard-working man who put himself through college after he married, went on to graduate work and ultimately became a professor. We moved around quite a lot. I never was particularly interested in school. I was one of the good boys and I got along nicely in school because I was good. I

was one of the rather non-social shy children whom teachers all like. My scholastic interests were minimum, except English and drama.

"I didn't get along too well with other children, but always had one or two close friends. I had one difficult year when we moved and I was a stranger and very tall and thin and physically ineffective. I found out what it meant to be a minority group member. And then we moved back and sex had arrived, which was very happy. My high school years were very highly heterosexually oriented with lots of dating and dancing and great interest in reading and writing. I did a lot of acting and journalism; I played the piano and learned to play jazz. I was thoroughly and completely an ingroup member then.

"It never occurred to me that there was anything anyone did except go to college. I don't think vocational plans ever entered my head. By my junior year I decided to become a short story writer and became quite a Bohemian, interested in the esoteric and an expert on metropolitan speakeasies and on local wines. At the end of that year I got engaged. She'd had to go to summer school so I did too and we took Psychology 1. We sat in the back row and held hands and went out and studied together under the trees. This undoubtedly had a profound effect on my interest in psychology. On the other hand, we also took sociology together and it didn't have any effect on that. I looked on psychology as a refuge from the vagueness and what even then struck me as the amateurish guesswork of English criticism. I was quite dissatisfied with the balderdash about motivation and character and so on that you got in that. By that time I had begun to suspect that I might not be the kind of short story writer that eats. I liked learning theory and I loved the objective questions. Just this incredible number of isolated little facts. It provided a certain solidity, it was so nice to get things down to a really precise point. And I found some very smart, sharp, good people in psychology who were very much interested in me and who spent time with me and gave me interesting things to do, like measuring things and finding relationships. If any one course were to be given credit for my final choice, it would be the course in experimental.

"I went on for graduate work with the notion that I would go only for a year and it would be nice to get far away from home and fun to see something of the rest of the world. I suppose this was probably about 80% of a decision toward a profession but I can remember I had a feeling of not having made a decision. I couldn't seem to think of any alternative. I didn't like it, it was ghastly, but after two months you couldn't have gotten me out of it. I guess it was like taking religious orders. Part of it was the enthusiasm of

some of the people. I started working with one of the professors on an experiment; I did a lot of research and then there was just no further question."

SUMMARY

This group came from lower to upper-middle-class backgrounds and the economic level varied from quite poor to well-to-do. Many of them had feelings of apartness relative to themselves or their families but it is rare for these to be colored with inferiority feelings. More than half of them had some definite sense of personal or family superiority, and family concern with social status, in one way or another (as striving, as recollection of striving in the parental generation, or as consciousness of belonging to the "best people").

The earliest vocational decision for any of this group was the sophomore year in college, and over half did not decide until after they had graduated from college, several not until they were part way through graduate school. Their earlier interests were oftenest English literature, although some had social interests and some began in chemistry or engineering. The final deciding factor was often the experience of doing research.

There is no consistent pattern of reading interests during childhood and adolescence. The amount ranges from none to "reading was my life," and there is no concentration of frequencies. In college or high school, six of them did some writing or editing or both.

School work was always easy for most of them. Only one said he never did well in school, but several others did not make exceptional records. Two were extremely interested in school athletics.

Four suffered the loss of their fathers (at 8, 12, 14, and 17 years), one also his mother, but there were no homes permanently broken by divorce or separation.

One subject's parents were divorced but remarried shortly afterwards. The father of another died while the son was in college.

Inquiries about health during childhood and later uncovered a number of problems, of varying sorts. There is no record for one. Five stated their health had always been good but one of these developed migraines when about 25 and another developed a number of allergies in later life. Two have had hearing difficulties from an early age, and two have had some eye problems which have been corrected. None of these problems seems to have been an important early factor.

There were 4 who had quite serious problems which were constitutional. Two of these were abnormally small and 2 were abnormally tall. These were their comments: "I was always pretty small and slim but my coordination was not too bad. I made basketball (in college) but dropped out, I was too small for one thing." "I was always a very tiny boy. When I entered high school I was 4 feet 10 inches and weighed 68 pounds. I was small and so the group I went around with was younger. In college I had gotten to normal height but I always had this picture of being minute." "When I was 15 years old I was 5 feet, 11 inches and I only weighed 95 pounds. I was incapable of doing most of the things required in gym, so I used to get under the mats or hide behind them and stay there as much as possible." "I was very tall and very thin and my adolescent growth spurt had come at the beginning of 12 years so I was very ineffective and I had sick headaches. I suppose that they were probably excuses to get home from school. My health has always been doubtful. I am somewhat hypochondriacal."

One of this group was always an isolate but the size factor was a relatively minor

one in this picture.

There were other problems. One subject had diphtheria at 4, followed by a temporary partial paralysis, but was otherwise never seriously ill. Another was sickly as an infant, had many serious illnesses as a child but had not had any since. A third suffered from one long series of stomach aches and nosebleeds, probably because of poor nutrition. Another said, "I was fairly sickly when I was a kid. It was a very rare year that I didn't miss a block of 2 or 3 weeks or more of school because of some illness. And I must have had ulcers by the time I was 15."

It would appear that health and constitution have not played any clear role in this group generally. In only one instance does it seem likely that they contributed significantly to difficulties in social integration.

The patterns of psychosexual development are discussed separately, in Chapter V.

THE ANTHROPOLOGISTS

O. "My family background is nationally very mixed, but it is mostly farming, although father was a small businessman. We were definitely in the upper-middle class until we moved when I was 12, and our status changed to lower-middle class, which was very painful for Mother. I had a very unpleasant time in grade school. Mother insisted on status differentiation in terms of clothes and so on, but after we moved this situation changed, and I got into athletics, too. At studies, of course, I was a very bright youngster, and that was another thing that put me at a disadvantage at an early age as I was considered teacher's pet.

"Pretty much from the time I was 7 until I was 15 I was quite determined to be a writer. When I went to high school some one had tipped me off that if you want to be a writer and eat you ought to take courses in journalism. About half-way through high school I don't know how it came about, I decided I wanted to go into archeology. I knew very little about it except the King Tut tomb stuff. I had visited the Chicago Museum, and I think I heard my father talking about it and I had read something about it. I

suppose the aspect that appealed to me was that it combined both the rugged outdoor life, this side that I was always striving to be proficient in, with some intellectual content, and I couldn't just be a ditch-digger but this was ditch-digging with an intellectual content and it was glamorous.

"College was always taken for granted. The school advisor didn't know that anthropology was also archeology, so she could only find a small state university that seemed to give it as a major so I went there. Many of the students spent quite a bit of time mending pots or working around the archeological laboratory, but I never did. I would never go on field trips during vacation because I wanted to spend my time on the beach. Looking back over it, it looks rather bad, as though I didn't have any honest interest. I must have been pretty much of a horrible social snob, too. The other students in archeology seemed a little second class socially to me, and there were times when I thought maybe I'd do better to switch back to my earlier ideas of being a writer and I took as much in English as I did in archaeology. During the year I worked for an M.A. I did quite a bit of reading and I became really serious. The chairman of the department encouraged me to go on, somewhat to my surprise. I got a summer fellowship which opened up a wonderful door for me. If it hadn't been for that I would have been out of luck. I learned a lot and I learned how little I knew. I worked for two years with a man I met on that trip and for the first time I got to know something. Then I finally got a fellowship and went on for my Ph.D."

P. "There were no professional people on either side of my family and my father was a superintendent for a building company. We were not well off, but mother had been a teacher, and she kept up pretty close personal contact with all my teachers. I did quite well in elementary school. I think I was a pretty conforming fellow, all the motivations were stacked up and mother was interested in grades. I went to a manual training high school because they had a swell mandolin club. I wasn't athletic but I worked on the school paper and I had a wonderful time and all that kind of thing. At the end of my high school career the college question came up. My parents wanted me to go and I didn't care. I didn't know what else to do. I went to the business school because this didn't require passing exams. I took a major in economics and spent a lot of time with the mandolin and glee club.

"Through contact with social science, the problem of social reform began to agitate my mind a bit. I took no anthropology, I had never heard of it until I met an anthropologist who was a

member of my fraternity in my senior year. By the end of college I wasn't interested in doing graduate work in economics and I didn't want to go into business. I had done some volunteer social work and I was offered a case worker's position. Everyone thought it was a funny thing for me to do at that time. After a couple of years of this I decided to do graduate work in sociology and did so while I kept a full-time job. I took some work in anthropology and I discovered, and this stirred me up intellectually, that as in contrast to sociology, anthropologists were very skeptical about social evolution. That intrigued me, so I began to read and I got more and more interested, and dropped sociology altogether. The department was small. The professor was the kind of fellow that loved to have people hanging around and talking to him, so I got a lot of stuff rubbed off outside of the regular classwork, and he wasn't concerned about attendance.

"I was still in social work when the psychological revolution began. That's when I began to read in psychoanalysis. There was no psychological aspect to anthropology at that time and I had taken only one formal psychology course in my life. I gave up social work when I was offered a fellowship. By then I had determined to make anthropology my career. At that time I had done no field work, but was soon able to make a few short trips. When I began to do field work there was practically no psychological slant at all. It's hard to make a precise statement as to how I first brought an old interest in personality psychology into relation with the study of culture. I knew A. A. Goldenweiser, Ruth Benedict, and Margaret Mead personally and read all of their publications and I had listened to Goldenweiser lecture on psychoanalysis. Then there were the early programmatic articles of C. G. Seligman and Edward Sapir."

Q. "My father was a business man who did a good deal of foreign business and was away a great deal but sometimes he took me with him. My mother's family came over in the Mayflower. They were so bogged down in the haze of myth that I can't make out much about them. My grandfather took care of me. He told me all sorts of stories, so I was brought up on a diet of bloodshed and adventure when I was a child. I didn't think much of that until recently but I think it's probably important.

"I went to regular school but I was always getting expelled and sent home. Then I used to go out in the woods all the time. I got into all sorts of trouble in high school. We made every possible attempt to outwit the authorities. I led a stink bomb attack on the faculty and then father sent me to a private school. I graduated *cum laude* and took first prize in

Greek. I was doing a lot of reading of Egyptology and started learning hieroglyphics but I couldn't see that what I was studying had any relation to what I wanted to do, so I flunked plane geometry three times. I didn't like anything except geography and Greek. I couldn't do math and I hated history. Languages were a cinch. I wanted to be an archeologist and an explorer. I read adventure magazines and all those things.

"I figured it was necessary to go to college, and Father picked the place. I wasn't particularly happy, I didn't like it particularly and the professors scared the life out of me and I got jaundice. I started out to major in the classics but I was disappointed because I discovered the reason I liked the classics at prep school was the teacher. But from then on I was taking mostly anthropology and I was getting around with the graduate students mostly so I was much happier. I spent several summers abroad. We used to see how many borders we could sneak across, and I got in some field work in anthropology."

After a half year of graduate work he went into the field on a fellowship where he had an assortment of physical mishaps, and illnesses, which put him to bed for some time. However, he managed to do some studying and got through his prelims. Later he went back to the field to work on his thesis, and had his usual exciting time. Again there were illnesses but he eventually got back and took his degree.

R. "There is some intellectual tradition in my mother's family but none in my father's, although there were some professional men. Mother died at my birth, and when I was about 5, I went to live with an uncle who became my foster father. He had inherited sufficient money that he did not have to work, which is not the custom in a middle-western town. There were two distinct social groups in the town, and father was accepted into the more snooty one, but mother was not.

"In grade school I was very successful as far as grades were concerned, and I had one year in the local high school. I did a lot of reading, and I had an active social life and lots of athletic activities. When I went to a private school for my last three years I was young for the group and too undersized, and also rather naive. I wasn't any athletic shakes and this was terribly important. That first year was very bad, but I returned out of sheer stubbornness, and my last year was very pleasant. I was too young for college so I was sent to another prep school. There, in many ways I found myself. I found a kind of life in my own age grade which more or less inchoately I had been groping for. A kind of realization of some of my intellectual and liter-

ary efforts, and in contrast to before, when I entered as a young squirt, here I entered at 16 with military school experience and a little athletic renown and I got away with being something of a sophisticate. The more I liked it there the more I immediately started to look down on the first school in intellectual things and I'm afraid in class terms I was something of a snob.

"College started off very well but I soon got into rather involved difficulties and was sent home. After some time I went West to visit a relative. This is a nice point of the role of accident in human life. If my mother's cousin had had a ranch in a different place or had been without intellectual interests, the whole future course of my life would have been very different. This guy had intellectual interests and a good library and lived in Indian country. Without realizing it, this was inevitably the beginning of my anthropological interests.

"Eventually I went to another college. I got along well, I was elected president of my class. I fell in love and I finally decided to finish there. I was thinking of the law but only of an undergraduate degree in it. I got away with murder there, I had a good memory for words and verbal facility and while some teachers were sincerely motivated and deeply impressed me and what I did for them was honest, a lot of my instructors I just used to twist around my finger. I would throw esoteric references at them. I did crazy stunts that made me notorious. I was president of the male student body and chairman of the newspaper. I was out of athletics but I led a pretty vigorous social life. I thought about literature as a career but some of my teachers had convinced me that while I was not completely hopeless, I was not likely to set the world on fire.

"During the summers I took pack trips among the Indians with friends. I didn't know there was such a thing as anthropology. Then I got a scholarship abroad and that was quite an experience for me. I had had an experience of four years of being a big shot . . . for the first six weeks abroad no one really spoke to me. I couldn't get away with anything in my tutorials and I was very much humbled and I realized I had been a fraud intellectually. I decided to stop that, so I worked far harder than I ever worked in my life. I just worked like hell. After the first year I had to some extent caught up with the lost ground so I could hold my own.

"I came back and tried a few weeks of law school. I thought and discussed things and I did quite a bit of reading and finally I couldn't tell you exactly when or how, I don't remember there being any sudden revelation about it but somehow the word anthropology had come to me and I had done a little reading, precious little, in the field and I made up my mind that

I was going to become an anthropologist. I did this for several reasons. It would give me a chance to be out-of-doors which I loved, and it would link my life respectably in a socially approved way as opposed to that of a dilettante with the Southwest and then I remember saying, 'If I go into anthropology I can study any damn thing I want to and it will be part of my work.' I meant anything related to human activity and it will be part of my work."

S. "Both of my parents were born in the West, of pioneer families. My father was a lawyer with a good practice. The men in the family are generally professional and mostly lawyers. Father was raised next to an Indian village and was attorney for a number of the Indian tribes, and of course I got interested in the Indian background.

"I went to a public grade school, then to a private high school until my last year when it failed and I returned to public school. After school I went home and played around the house with neighboring children. In high school I went into the woods and studied birds. I did an awful lot of reading. The house was full of books, my father loved books and I read everything in the public library, particularly nature stuff and military stuff, nature books and travel books. I read some dime-novels, of course, but I don't think I ever went through a period of trash.

"I don't think anyone thought I would go to college because I was very poor in math and languages in high school and excellent in history and English and things I liked, and I think the family thought it would be a waste of time. But I wanted to be a naturalist. I didn't know much about how to become one except that I knew I would have to go to college. I was interested in ornithology particularly. Father was pleased but he said he had never heard of anyone making any money as a naturalist but that it was all right and if I became good at it he would help me if he had any money.

"Then in my senior year in high school I enlisted in the Navy. That experience is important. I think I would have made a good officer, but I did not make a good enlisted man because I was not mechanical. The main thing I was travelling, but we didn't see anything of the world except the ocean. There was an old-fashioned but good library aboard this ship, including Darwin's work, and I read the *Origin of Species* and the *Descent of Man*: that made a great impression on me. It gave me some scientific background for what had been just a collector's instinct and innate love for nature. It was in the Navy I began to see a difference in a very marked way between the officers and the

crew, the lines are very sharply drawn. I began to see that it wasn't just chemistry and math but that there were other things that you could get and learn.

"I registered as a pre-legal student and later changed my major to history. I didn't know anything about taking biology. You can't take a course in Darwinology and I didn't know what these other things were. I collected birds for the college museum, and then in my junior year had a field trip with a museum party. That was fascinating. I was doing professionally what I had done by myself and became aware that people did it as a business and at least were able to eat some of the time. Then I had to find work and the professor of anthropology gave me a job which involved real research. I became more and more interested and then I found to my surprise that he had put me down as joint author of the reports. Once I really got into anthropology there was nothing more for me. I think that if any motif runs through, it's that interest in history because I went from law to history, it's history that I was interested in in high school and the major aspect of evolution. I had the interest of a naturalist, too, but dissecting left me cold, I was never tempted to go on in zoology. My three graduate years were without doubt the most exciting of my life. It was a period of life opening up as more than work, and sports and books. We were all poor and working like hell."

T. "My family on both sides were farmers with a fair education and of moderate social status, and I was born on a farm that had been in the family many generations. My father was a man of great ability, unusual intelligence, and violent temper who made and lost at least 3 fortunes. In the days when I was growing up the family was comfortably fixed but not wealthy. I was never close to anybody as a child. I went to a small religious school and there I was intensely unpopular." (After some years of being bullied he developed enough strength to fight back and in a deliberate campaign thrashed one boy a day.)

"From the time I was 10 I worked in my father's business holidays and summer vacations, although later I took summer farm jobs. In high school I was an omnivorous reader. The family subscribed to various current magazines, like *Harpers*, and there was a library in town and I got books from it. I was very eager to learn and there wasn't much chance to learn. I found elementary chemistry and physics mildly interesting. I think the reason was that it was the liveliest research subject. I learned about research from the old *Scientific American*. I knew about it very early and I knew I was interested in it, but the education in the schools was very poor.

"I went to college planning to be a chemical engineer. In school I'd never had to do any studying, the general courses were geared to a much lower IQ so that it never made me work and I had no idea how much mathematics would be required. I've never been able to do math. I did no work my first year in college; out of 34 credits I flunked 11 and was conditioned in 17. My father said he would give me a job but that was the last I could expect from him, and I had completely fulfilled his expectations. Of course this made me mad and I made up my mind that I would put myself through college, so I went back and worked my way through. Then I decided that if I was paying for my education it might as well be something that I was interested in and I went into biology, which was the only other science they gave. There was a period in here when I had difficulty making up my mind whether to go into writing or biology. It was not entirely youthful enthusiasm because as an undergraduate I wrote well and I had several things published. When I took up biology I was thinking of the great open spaces, of collecting and exploring. I had one course in so-called anthropology and in my sophomore year went out on a field party, and a year later on an expedition. By my junior year I had made up my mind, and after graduation I went right on."

U. "My father was a well-to-do businessman and we lived in suburbs and had private music lessons and other advantages of that kind. I liked school and did very well. I began an avid reading career as soon as I was old enough to take out a library card, and my other major interests were drawing and music. I went to two poor high schools and then to a classical high school with extremely high standards. It was really a delightful school with definite emphasis on scholastic achievement and to hell with athletics. You were expected to do three hours a night homework and sometimes more, and the pressure and competition were hard at first, coming from a regular school. There was lots of intellectual snobbery. Of course there was an excess of bookish children so I was happier there than I would have been elsewhere.

"There was no question about my going to college, it was always assumed I would go. I tried to get into Annapolis but was unable to pass the physical examination. It was a terrible blow, I was very depressed and upset. I know now I would not have liked it too well. The idea of the freedom the Navy seemed to offer in getting around the world was probably one of the factors in my great interest in far places and in field work. I had no vocational plans when I entered college, although I had thought vaguely of being an author or a doctor. I started

concentrating on classics but toward the end of my freshman year I felt I had to make a change. I was very snotty about English because I had already read so much that was required and I thought no professor could teach me anything at second hand. I had read Darwin and I had read a little about anthropology so I took a general course in anthropology and loved it. I really enjoyed every bit of it. My interest was almost immediately in the direction of the biological side. Of course physical anthropology is the most precise part. I like things that have a clarity and a precision and I like the concrete aspects. I like having the materials under your hands. I took a course then in physical anthropology, still not thinking about doing it professionally but I was very deeply interested. I had had a taste of business experience summers and decided against that as a career. In my senior year there was another thing. In the usual arrangement you take courses and the professor comes in to lecture and you never see him outside and this is one thing, but working in a museum where you are part of the apparatus of the department and you get a taste of what they were doing privately, where you see the work, this set-up might very well have been sufficiently entrancing without my quite realizing it. It's the first time I have thought of it. I vaguely knew that people could do research but that I could do it hadn't occurred to me until then and it was a very exciting prospect. By my senior year I was well set although vague as to what and where. But I got a fellowship for field work and after that there was no question but that I was headed for a career. Of course there was the whole mental turmoil and excitement and the drive that comes with a great absorption, that's understood. I'm

V. "I was conscious from the first of belonging to two pasts because my father's family on the whole represented an old American family that had lived in the same place for four generations while my mother's family were all Europeans. The family was one which was more self-engrossed than most at the time in America. We developed forms of living which were different from those around us. I had a number of serious illnesses as a child and father was very protective. I studied with tutors until I was in the 8th grade. I made serious natural history notes and read a great deal. I had lots of opportunity for individual experience in following things out just because I liked them. As I grew older the difference [between him and others] became one of superiority, but along with this went the feeling of superior responsibility. I could do things other people could not do and therefore I had to do them. I knew early that you could have a career as a biologist and that was my first plan.

"I had some difficulty adjusting when I first went to school but in high school there was no awkwardness. My interests then were chiefly literary; I had no particular interest in laboratory science but I continued to do natural history. By this time I was writing poetry and so were a good many of my friends. We were a somewhat precocious group of literati.

"My college career was interrupted by the war. I enlisted in an ambulance corps and I took a very bad beating. The group was a nice group to be with, but they were a bunch of hoodlums, undisciplined, and the occasion was such that they didn't get any discipline. I first came into contact with the way young men really lived. But I saw hard service also. Then the unit was disbanded and I just came home. I came back very much confused and disorganized and this lasted for some time. I didn't know what I wanted to do.

"I finally started law school and was admitted to the bar. I got to a state of great restlessness. I didn't like my work. My wife is an enterprising person and willing to take chances and with her urging I took a long vacation. We went to a primitive area, and through an old acquaintance from there we met an anthropologist working nearby and we became intensely interested and did some field work. Meantime I was greatly encouraged by a professor of sociology and through his influence I became very excited about concepts of the science of society. So I became an anthropologist and went back to school and did more field work. My personal life was opening out very richly and it was wonderful."

SUMMARY

The average economic level of the anthropologists is clearly higher than that of the psychologists, and concern with the social status of the family or a firm conviction of the social superiority of the family is evident in all but one instance. This did not always result in the development of a definitely socially snobbish attitude in the subjects, but there is good evidence that most of them did consider themselves superior in one way or another. All but two of them went to private schools, either elementary or secondary, and this would certainly tend to foster these attitudes.

Two of this group decided on their vocation in high school, three in the later

years of college, and three after graduating from college. Their earlier interests were somewhat varied. Four mention outdoor and athletic interests as having been of importance and a factor in the choice of a profession involving field work. Two with natural history interests, one with an interest in science generally, and three with interest in the classics could continue to find these interests in their profession, as could those whose earliest professional interests were sociology and law. Six of this group at one time or another had a special interest in literature and writing.

Reading interests are varied. Most of them did excellently in school, or at least did so in those subjects in which they were interested, and characteristically put little effort into the others. They have, however, a general dislike for mathematics.

Health during childhood and adolescence was apparently good for only three of them. Another had good health until an attack of rheumatic fever during secondary school, with some sequelae, which have not interfered in his field work. There are five who apparently had constitutional difficulties. Three were underweight or undersized, and in addition one of these had a number of allergies and the other had a number of serious illnesses, sufficient to have affected his early schooling. One was oversized ("I don't know whether it was pituitary or overeating, because eating was about the only satisfaction I had"). Another was always the tallest in his age group which sometime gave rise to awkward situations. Another said, "My mother or at least I, had the idea that I was always a sickly child and I was always having to go to bed but there was nothing really wrong with me."

As in the case of the psychologists, the

importance of the discovery of the possibility of doing research as a factor in choice of vocation is clear.

COMPARISON WITH OTHER SCIENTISTS

Although there is not much difference in the general socioeconomic background of the different groups of scientists (except for the subgroup of theoretical physicists, 84% of whose fathers were professional men, as contrasted with about 50% in each of the other groups), there does seem to be a difference in their social attitudes. Among the biologists and physicists I encountered no direct expression of feelings of personal superiority, and there were very few by inference. One of the physicists did say that the family considered themselves extra privileged in spite of their extreme poverty; there are a few others who probably had some vague feelings of family superiority on one basis or another, and there are some who were conscious of their intellectual superiority, but they seem not to have translated this into social terms. It is, of course, not certain whether this is because these groups don't think in such terms, and hence it would not occur to them to mention it, or because they actually do not have such attitudes. I think it is primarily the latter, although the former may play some part in it—it is an aspect of their rather general indifference to or avoidance of personal interaction. But among the social scientists, in at least half of the psychologists and in most of the anthropologists, a feeling of social superiority has definitely played a role in their development. In some instances this feeling is a product of the family's or particularly the mother's strivings (or a paternal grandmother's). Further data on this point will appear in the next section.

In the matter of early interests (the term refers to spontaneous activities) this group differs markedly from the physical scientists, almost all of whom displayed early interest in mathematics, chemistry, physics, or gadgeteering, and very few of whom were ever interested in literature or the humanities. Two of the psychologists and one anthropologist began in chemistry but quickly shifted. Literature and the classics, and less frequently social welfare interests, were common among both anthropologists and psychologists, as were some natural history interests, particularly among the anthropologists.³ The biologists included men whose early interests had been in natural history, in literature, and in chemistry or physics, although the latter interest seems to have been aroused largely because these were the only sciences available in high school. In the histories of the social scientists and of the biologists the importance of the discovery of the possibility of doing research is highlighted, and this was often the factor that gave the final determination to their choice of vocation, or that fixed them in it once it was chosen. This particular aspect did not appear among the physical scientists, but this may well be because the difference between gadgeteering and experimental work is really a matter of degree and emphasis; the possibility of doing things yourself is obvious, whereas in the other fields it is not. It would seem that this may be an indictment of the pedagogical techniques in general use.

For the total group of scientists the median point of decision on a vocation is in the later undergraduate years, but

it can be as early as high school and as late as postgraduate years. It is later for the social scientists and particularly for the psychologists. Psychology is encountered late in school, and lacks the popularization given King Tut and other archeological stories, and the adventure aura. But very few in the total group did any long range vocational planning.

Among the biologists, 5 lost father or mother before the age of 10, and the parents of two others were divorced (when the subjects were 9 and 16). Among the physicists, 5 lost a parent by death (at ages 5, 6, 9, 15, and 17) and the parents of one were divorced. There was only one divorce among the parents of the social scientists (and they remarried), but the mother of one anthropologist died at his birth and 4 psychologists lost their fathers by death (at 8, 12, 14, and 17) and one also his mother at 17. In the case of the biologists and physicists where the losses occurred very early, it seemed possibly to be a factor in the acceptance of isolation by the subjects, but among the psychologists and at least one of the physicists whose losses were later, the effect seems to have been more one of increasing the problems of adolescent reaction to authority, and this effect seems to have been greater in the case of the psychologists who have been more concerned with personal relations from the start.

A special factor, occurring generally only in the theoretical physicists, was the apparent effect of severe childhood illnesses which contributed to personal isolation. In all of the groups there are a number who had developmental problems related to constitution—abnormalities of size or general weakness. Unfortunately I have been unable to find comparative figures for the general population.

³ Baas' study of interest patterns of psychologists on the Kuder showed that all psychologists groups had high scores on the literary as well as the scientific scale (2).

V. PSYCHOSOCIAL DEVELOPMENT

In this chapter an attempt will be made to summarize for each of these subjects something about the family climate and discipline, and their relations to their parents, as well as their general social development. There is a good deal of information for most of the subjects. Each paragraph refers to a different subject; the paragraphs have been arranged in groups to illustrate special situations.

One subject lived away from home during much of his schooling and was off on his own when he was 18. His parents seem to have been thoughtful and helpful but there is no feeling of closeness. He grew up very much to himself and was early discouraged in athletics because he could not compete with his older brother who "dominated the scene."

(A number of the families were self-isolated. These include the next 5. In the fourth and fifth the isolation resulted from the mothers' attitudes of superiority.)

In one family relations with the other relatives, as well as with the immediate family, were very close. "I never saw my father and mother quarrel. It was a completely false family picture of idyllic bliss. I think the family were completely protective and it's always puzzled me as to why. Mother was very close. I always thought father was tremendously fond of his family but completely unaware of them. He definitely dominated the family. He would read at the table. They had no social life of their own. The family was essentially socially self-estranged."

Another family pattern was "kind of incredible. We were a family that kept completely to itself. They were very adept at thinking up things for us to do. They seemed so good that it was very hard for the children to rebel. The notion of not coming directly home from school would never have occurred to any of us."

The family of another were also self-isolating, in part because of living in a country place much of the year, and in part because of the personalities of the parents. "Mother was intensely sensitive and extremely fastidious. My father was intensely protective of his family. His idea was to save them all trouble, to keep them all from harm, to keep them secure from the world and to provide them with material comforts. The only conflicts I had with my father were over this. As I got into my teens my form of reaction was to become uncomfortable at the overprotection. I can only remember a few instances where there was any open conflict." But

he enlisted without telling his family until afterwards.

One reports, "I was never punished by my father but was always in fear of him. A threat of punishment was always held over me. Mother used a fire shovel on me. I had a considerable mother attachment and great antagonism to Father. He never gave me any explanation of anything. He was completely authoritarian. I took it as a matter of course until I went away from home."

Another says "Mother carried embittered feelings about how people had looked down upon her because of the poverty of her childhood. She looked on her marriage as a vindication. She was a very strong-minded woman and was dominant in the family. Father is quite a passive person. I was always in conflict with her but there was a great attachment."

(Those whose fathers died when they were quite young are grouped below.)

Discipline for one was "liberal but with fairly rigid standards, but coercion was subtle. We were all good children, we never had a hand laid on us. We were indulged, we never did any chores. Mother kept us dependent on her in some ways and she could get us to do what she wanted us to. We developed a pretty strong sense of moraloughtness."

After the death of the father another family moved about a good deal because the mother had never established any roots. The early period had been very different, although the father was away a good deal. "You have the impression of this strong dominant father coming home and everything getting organized and there would be dinners and so on and then he would leave and things would quiet down." He went through a difficult adolescence with generalized rebelliousness, which got him into trouble at school. "It probably should have been more directed against Mother. It would have been more relieving but it could not be because she is a sort of unstructured person. The death of my father was crucial because it came when I was working out authority relations and I had no one to take over as a surrogate."

Before the death of his parents another says he was much closer to his mother, although a long illness kept her very restricted. "Mother was very popular and sweet-spirited. Father was quite taciturn and strict in a sense and kind of a compulsory, demanding person. He was strict in the sense that I would get hell for not taking care of my bicycle; I never felt I was picked upon. I respected him. His weaknesses are my weaknesses. I don't know what would have happened if he had not died at that time. I remember taking his reprimands more seriously when

I was younger. When I got to high school, we regarded each other as individuals."

One subject spent a good deal of time at his father's place of business until his death. "I think I took his death fairly naturally, although I was upset of course. And it meant Mother had to step right into the business and I was alone a lot and had to shift for myself. We hadn't been close but I had spent so much time in his business and we did a good many things together. Mother and father had violent disagreements and I was bothered that my father was a rigid person and I must have been beginning to rebel against that set way of doing things. Of course then mother and I were very close for many years. But she let me go off to school, she never restricted me, she never seemed to be jealous of the things I did." Since he did a very good job of shifting for himself, and was very popular in his age group, the net result seems to have been that he avoided a serious conflict in adolescence.

(In the next few, there were no overt problems. Note that two make the point that their being away from home eased the situation.)

One says that his father had a very mild temperament, and he does not recall ever seeing him angry or being particularly disturbed over him or any of his sibs. "We had a great deal of freedom. We used our own judgment but we knew what the ideals were and what kind of things they would want us to do and didn't want, but they never told us outright. Looking back on it, it's kind of a mystery to me. We were never overtly praised but there was a subtle awareness on our part that our parents were appreciative. There was perhaps a tendency to play down success a little bit to prevent becoming cocky or too self-satisfied. I don't think I ever became rebellious; I suspect the small local environment was restrictive as much as the family."

The family life of one subject was apparently relatively placid. His mother was a gifted person who sang and composed quite spontaneously and was very social and warm. About the only open pressure put on the children was an attempt to make them practice two hours a day but this was given up, largely apparently because of the fight put up by an older brother. "My father was a man who values independence and self-reliance and he is anxious to see his sons have it." To this end he gave the son a good deal of support, both personal and financial, and there is no evidence of any serious problems arising. Their present relations seem closer than any others in this group.

Another reported differences in parental interests. "He was a very austere and intellectual person and she was a warm, affectionate one. I suspect there was some unhappiness there." I have no record of any particular difficulties be-

tween him and his father, who certainly gave him considerable vocational encouragement, but it may be that his early enlistment served to avoid this. "I was very innocent and protected when I went in, I was just 18. At first I was kicked around. I would write in a diary and read books and everybody thought that was very funny. At first it bothered me the way they carried on about it, but after I took up boxing and made a place for myself they left me alone. I realize now I had been looked after too much, that there has been this pattern of extended protection not only because I was an only child but Mother had her own ideas and she was anxious to bring me up in the right way. Father, I realize now, was pretty much under my mother's thumb. It's undoubtedly true I had a very close attachment to her and revolted, but it didn't come to any actual crisis, there was a general withdrawal. I was away for so long."

"Dad let Mother be the boss in spiritual and moral matters but he was a titanic person in his own way. There was a division of labor that seemed authentic and all of us children felt that our parents were adequate. There was no rejection and unstructuredness about it. There was a time when I hated my father, at least I hated his sort of crudeness. I had quite a rebellion thinking he was a hard man and not understanding. I think I had a normal amount of adolescent separateness and rejection. But I was away from home and I didn't have the friction and I was making my own way."

(In the rest a variety of problems appear, some of them of great severity.)

"I didn't see a great deal of my father. I guess I took Mother's side. I liked him when he was nice to me. I was always a little afraid and upset by him. I recognize now it wasn't so much by him but the situation involving mother. Later on it looked as though my aunt and father were battling to see who would be head of the family. I'm afraid I adopted a retreating attitude."

"I think family discipline was very strict as I look back on it. I think father was a very strict person and I'm sure I had very strong fears of his censure. I went through a religious period about 13 or 14, it was very intense, then I rejected my father and God all in one fell swoop. It stuck for God but not for Father. I don't believe I ever rejected him or his authority. I never fought the battle out with Father. I never tried to argue with him. I just shut up and hoped he would not ask questions. I think all I have done has been kept this side of a line to avoid his displeasure but I didn't feel any relief at his death a few years ago."

The history of one subject is of revolt against one authority after another, although it is not altogether clear just how his family figure in

this. "Mother was pretty much under my father's thumb. I was generally fairly antagonistic to her, she was always trying to stop me from trying to do things. There was always a lot of argument about drinking. Mother didn't approve but father invited us to drink with him in the cellar."

"In my opinion a great deal of the pattern of my life is to be understood as a reaction formation against my father." The family situation was socially and personally a complicated one, and this subject is probably correct in his interpretation. The forms of his revolt were also complicated, but before he went to college there was open enough friction between him and his father that a family friend interfered.

For another subject relations with his father were of considerable importance. "I had great respect for him. I thought he was one of the smartest and most successful people I had ever known. I also had very little affection I can recognize. He instilled in me the feeling that I was bad, so I grew up with the impression that I was the sort of person people did not like to have around, and if I walked down the street and one of my companions was across the street and didn't happen to see me and didn't speak to me, I just took it as further evidence of the fact that people didn't like me. Mother never gave in to me but at the same time she was much gentler and more understanding, and even if she didn't understand she would go along with me."

"Father seemed to me to typify a rather clear culture pattern that existed through the Middle West, the pattern of the good moral family, hard-working and making their own way. He is a tense man, rather stern, affectionate, but terribly pressed with ambition. He was very punitive about aggressive behavior and very rigid about sex and probably a very anxious person and insecure in his social relations. My mother is a very neurotic woman, hypochondriacal and hysterical. There was nothing stern about her, she gave in to us. Her methods of discipline were via the channel of idealizing and I think my father used that, too. 'You don't love me' sort of thing. They had a device for putting serious arguments about things in a semi-joking way. I don't recall seeing any direct anger between them ever, and I think that has played an important role in my development. Then my brother got all the attention and I had a rough time but I guess I gave him a rougher one. I revolted violently in adolescence but as a rebellion it wasn't conscious at all. I never phrased it as that."

Another had a history of serious family problems from the start. His maternal grandmother lived with them and set herself to make trouble between the parents and particularly between him and his father. "My father was exceedingly hostile where I was concerned and exceedingly

unpredictable. I could never tell, when he came into the room, whether he was going to be nice to me or knock me down. My mother was very intelligent but sweet and negative, and never interfered on my behalf as far as I knew as a child. She simply stood aside, and of course while I was fond of her I had little respect for her. So the situation was I had a feeling from a very early age that I had to be completely dependent on myself, which resulted in a diminution of emotional affect. I was never close to anybody as a child. The thing that saved me from more serious psychological involvement was that I hated my father overtly."

It is clear that patterns involving overprotection and firm, if not overt, control are very common in the group. They are commoner among psychologists than among anthropologists among whom there was more overprotection and more open hostility. Over half of this group reacted with more rebelliousness than is generally usual, and of these a number are still angry or rejecting or disrespectful of one or both parents.

COMPARISON WITH OTHER SCIENTISTS

The data on intrafamily relations are more complete than for the other groups, partly because of the fact that these groups are professionally more aware of the possible significance of such relations and are generally freer in such discussions. But there is additional, if inferential, evidence from the TAT protocols, and I think there is no doubt that the groups do differ in these respects. Both the physicists and the biologists early developed ways of life which involved very much less of personal interaction, and neither group shows anything like the extent of rebelliousness and family difficulty that the psychologists and anthropologists show.

There are also many more in the other groups who were isolates as children, or who had only one or two close friends, and the age of beginning heterosexual interests is very different. Among the

biologists and physicists it is rare for there to have been any extensive dating in high school or early college. Half of the social scientists began dating in high school and dated happily and extensively from then on. Only four of them did very little or no dating until they were through college. Two of the psychologists apparently never dated any girl but the one each married (rather late in life), and have never had much social life since. These are very atypical for the group. Although a number of the social scientists, particularly those from self-en-

grossed homes, speak of being shy for a time, shyness was rarely the serious problem that it was with many of the biologists and physicists.

In the earlier monographs some space was devoted to consideration of present recreational interests. Inquiry was made about these in the social scientist group also, but as they differ from the others only in their generally greater interest in social life, which is a continuation of the patterns reported above, further details are not given.

VI. RELIGION

There are two Jewish families in the social scientist group, one devout and the other non-practicing. The others are all Protestant families, with most of the major churches and several of the smaller groups represented. The parents usually attended church, but frequently for social reasons. Only two of the subjects ever go to church now and one does not do so for religious reasons.

About half of the parents of psychologists were personally uninterested in religious matters (as demonstrated in church attendance), but only two families made a point of not attending church. Nevertheless it was customary to send the children to Sunday School and all of the Protestant children did go for at least a time, even the son of free-thinkers. Seven of the subjects stopped going fairly early, and while two encountered some family opposition in withdrawing there was no personal crisis or conflict over religion. Several quotations are illustrative.

"Religion was one thing we were saved. Mother went to church when she was asked to sing and usually went once more for every time she was asked. Father would go occasionally with her because it was the proper thing to do. And I

went to Sunday School and had the best necking of my life, but I don't think I've ever been in a church since."

"Both parents were church members but Dad never went. Mother was an Episcopalian and still goes sporadically. I was encouraged but not forced to go to Sunday School and I went fairly regularly. At 10 I shifted on the basis of the basketball court. I never joined a church and I never wanted to. After contact with a psychology professor and reading *This Believing World* which I got hold of somehow, I felt this isn't for me. Religion has never been a source of conflict for me in any way."

Five others were quite active in various ways, in young peoples' societies, in the YMCA, in teaching Sunday School, and continued their interest through college or beyond. Three of these were professionally interested, one actually serving as a missionary for some time and two studying religious education. For example:

"There was very much church influence. My parents were very religious and belonged to a group where the religion is quite emotional. I couldn't understand what was going on and couldn't appreciate it. I was bewildered and sometimes frightened. Church attendance was required and Sunday was very strictly observed in our family. At college I attended church services and Sunday School and was a leader in Christian Endeavor for a year or so. But I had no serious crisis. I had never taken the funda-

mentalist point of view, I had always questioned it and tried to analyze religion as such."

One subject went through an intense religious phase in the early teens of a rather extreme sort. This was not closely connected with any organized church activities but a very personal matter. "I wrote a Bible and then carefully folded it up and hid it, because I was very much afraid that my brother would find it. I had several miracles happen to me which I can't explain even now. I wrote them all out in Biblical prose. I certainly had some kind of sense of history and destiny. I suddenly threw it all over but there was no struggle."

The one psychologist who now attends church regularly, for religious reasons, states, "I find more wisdom concerning mind, values, conduct, and therapy in Christian doctrine than I do in our beloved but still puerile science of psychology."

Among the anthropologists the picture is similar. One of them who came from a Jewish family had a little religious schooling, but it was not important to his parents or to him. One was the son of parents who had a family tradition of agnosticism on both sides, and religion never was a concern to him. The other six were all sent to Sunday School, although the parents of two were personally uninterested. Four of these soon dropped out, usually because of boredom, but the other two retained interest for

some time, but have no church affiliations now.

COMPARISON WITH OTHER SCIENTISTS

Of the 64 scientists studied altogether, whose religious backgrounds were not known when they were selected, none came from Catholic families. Five came from Jewish homes, and all of the rest had Protestant backgrounds. These include two Mormons and two Quakers.

Among all of them the picture is much the same. Most went to Sunday School; very few now have any church connections. Two biologists are very active in church work; another contributes to a church but does not attend. Among the physical scientists none is personally active in any church, although there are five who have maintained some church connections, usually to please their wives. Among the social scientists, one is still personally interested in church, one goes occasionally, but not for religious reasons, and one pays dues but never attends. A few of them are militantly agnostic, but for the most part they are just not interested.

VII. THE VERBAL-SPATIAL-MATHEMATICAL TEST

This test (VSM) was compiled for the study by the Educational Testing Service. The verbal test contains 79 items in two sections, in each the task being the selection of antonyms. Time limit was 15 minutes for the two sections. The spatial test comprised 24 items, with a time limit of 20 minutes. The task was to select from four stimuli, the two views of the same figure. The mathematical test comprised 39 items, of mathematical reasoning. Time limit was 30 minutes. Examples are given in the earlier publications (20, 23).

Results are given in terms of sigma scores, in Table 6. The scores for the psychologists are based on the distribution of psychologists, for the anthropologists on the distribution of anthropologists. Two of the anthropologists declined to attempt the spatial and mathematical sections. The difference in means between psychologists and anthropologists is not significant for the verbal test, but t for the difference between means for the spatial test is 6.88 and $p < .01$; for the mathematical test, t is 6.68 and $p < .01$.

All but one of the experimental psy-

TABLE 6
THE VERBAL-SPATIAL-MATHEMATICAL TEST SIGMA SCORES

Subject	Psychologists			Subject	Anthropologists		
	V	S	M		V	S	M
Ps 1	+0.32	-0.55	+1.10	An 1	+0.57	-0.04	-0.67
Ps 2	-0.21	-0.55	+0.80	An 2	+0.77	+0.84	-0.06
Ps 3	+0.17	-0.78	+1.25	An 3	+1.22	-1.15	+1.15
Ps 4	+0.24	+0.41	-0.53	An 4	+0.26	-0.49	+0.85
Ps 5	-1.83	-0.07	-0.90	An 5	-0.14	-0.71	-1.58
Ps 6	+0.39	-1.26	-0.90	An 6	+0.55	+1.51	+0.24
Ps 7	+0.14	+1.36	-0.08	An 7	-2.03		
Ps 8	-2.05	-0.07	-0.68	An 8	-0.12		
Ps 9	+0.54	+0.80	+1.54				
Ps 10	+1.13	+1.84	+1.69				
Ps 11	+0.17	+0.65	-1.12				
Ps 12	+0.32	-1.02	-0.53				
Ps 13	+0.84	-1.50	-0.90				
Ps 14	+0.61	+0.65	-0.53				
Mean	57.7 ± 3.6	11.3 ± 1.1	15.6 ± 1.8		61.1 ± 3.2	8.2 ± 1.8	9.2 ± 1.4
SD	13.5 ± 2.5	4.2 ± 0.8	6.8 ± 1.3		8.9 ± 2.2	4.5 ± 1.3	3.3 ± 0.9

chologists has a higher sigma score for either spatial or mathematical than for verbal. Two of the others have their highest scores on the spatial test and two on the verbal, the difference in one instance being very slight. No tendencies are evident among the anthropologists.

TABLE 7
COMPARISON WITH OTHER SCIENTISTS ON THE
VERBAL-SPATIAL-MATHEMATICAL TEST

Test	Biologists (N = 19)	Physicists (N = 18)	Social Scientists (N = 22)
Verbal			
N right, range	28-73	8-75	23-73
Mean	56.6 ± 2.8	57.3 ± 4.1	59.0 ± 4.2
Spatial			
N right, range	3-20	3-22	3-10
Mean	9.4 ± 1.0	13.0 ± 1.2	10.4 ± 0.9*
Mathematical			
N right, range	6-27	4-27	13.7 ± 1.5*
Mean	16.8 ± 1.4		

* N = 20

The intercorrelations for the social scientists on this test are: verbal-spatial, +.18; verbal-mathematical +.27; spatial-mathematical +.36. None is significant.

COMPARISON WITH OTHER SCIENTISTS

Table 7 presents the material for comparison with the other groups studied.

The mathematical test was not difficult enough for the physicists. Differences between the means of the different groups are small and not significant. It should be noted that there is a large difference between the subgroups of physicists on the verbal test, the experimentalists averaging 46.6 and the theorists 64.2. On the spatial test, their averages are 11.7 and 13.8 respectively. If comparison is made by analysis of variance for five groups, experimental physicists, theoretical physicists, biologists, psychologists, anthropologists, *F* approaches the 5% level, even in these small groups.

Intercorrelations for the total group are given in Table 8. Correlation with age is significant only for the spatial test, with a *p* < .01. Of test intercorrelations, only the verbal-spatial reaches this level. It is clear from descriptions by the subjects that the spatial test can be done in various ways, and in part by verbal reasoning. The total distribution for the verbal test is strongly positively skewed; the spatial test distribution is platykurtic and the mathematical is bimodal.

TABLE 8
INTER-TEST CORRELATIONS, AND CORRELATIONS
WITH AGE: TOTAL GROUP

Variable	Age	Verbal	Spatial
Verbal			
'	-.11		
N	59		
Spatial			
'	-.40	+.33	
N	57	57	
Mathematical			
'	+.00	+.14	+.21
N	39	39	39

COMPARISON WITH GRADUATE STUDENTS

Through the courtesy of Dr. Irving Lorge of the Institute of Psychological Research at Teachers College, Columbia University, the VSM was given to all candidates for doctoral degrees in either philosophy or education in February, 1951. At the same time a number of other tests were administered to these 174 students. These data are presented in Table 9. They throw light on the nature of the test used in this study and make it possible to transmute raw scores on the VSM to scores on the Scholastic Aptitude Test. The two sections of the verbal test were handled separately in the correla-

tions, but were combined in computing equivalents on the scholastic Aptitude Test.

From the correlation matrix it would seem reasonably clear that the verbal test used here is a measure of the same function tested by Lorge's total verbal measure. Both the spatial and mathematical tests seem largely independent of the verbal test and of each other, the mathematical less so.

Transformation of scores on the VSM to Scholastic Aptitude Test scores is given in Table 10. The SAT equivalents of various percentile scores are given for each subtest. The normal mean and standard deviations for this test for applicants to college as undergraduates are 500 and 100. For doctoral candidates at Teachers College these figures are 570 and 130. These figures are not available for any other school. VSM equivalents for this average SAT score are 32 on the verbal test, 11 on the spatial test, and 8 on the mathematical. Five of the scientists are below the mean on the verbal, 29 on the spatial (but it must be remembered that this test correlates -.40 with

TABLE 9
CORRELATIONS OF VSM WITH OTHER TESTS
(N=174)

	Verbal		Mathe-mat-ical III	Spatial IV	Mean	SD
	I	II				
Completion	.716	.621	.204	.369	510.8	140.6
Vocabulary	.800	.715	.056	.254	555.0	128.7
Eng. Place Voc.	.823	.683	.178	.289	554.8	147.9
Reading	.652	.546	.322	.409	504.9	167.6
Total Verbal	.796	.681	.268	.416	531.2	132.6
Information	.318	.177	.287	.299	587.4	115.7
Arithmetic	.382	.278	.344	.764	593.5	122.1
English Usage	.662	.506	.283	.351	561.7	134.0
Reading Comprehension	.540	.399	.284	.363	532.5	157.6
Reading Speed	.423	.331	.256	.276	534.5	140.4
VSM, Verbal I		.795	.060	.299	22.0	11.5
VSM, Verbal II			-.091	.211	9.4	6.4
VSM, Mathematical					.378	8.0
VSM, Spatial					10.7	6.6

TABLE 10
SCHOLASTIC APTITUDE TEST EQUIVALENTS FOR VSM RAW SCORES

Percentile	Verbal I and II	SAT Equivalent	Spatial	SAT Equivalent	Math.	SAT Equivalent
100	75	892	22	784	27	1042
75	67	833	15	651	22	918
50	61	788	10	556	13	604
25	52	722	7	499	10	519
0	8	395	3	423	4	470

age) and 3 on the mathematical.

It is clear that the average ability of the scientists is very great. This is not surprising. On the other hand, it is surprising, and a matter of very consider-

able importance, that there are among the scientists a number who are not facile at the types of tasks presented by the VSM, but who have been able to make contributions of great value to society.

VIII. THE THEMATIC APPERCEPTION TEST

This test, devised by Murray and his associates (12), is a technique for personality analysis. It consists of a set of pictures, the task of the subject being to tell a story about each picture, including the events leading up to the moment pictured, what is going on, what the characters are thinking and feeling, and what is going to happen in the future. Only 9 of the usual 20 cards in the series were used in this research. They are cards 1, 2, 4, 6, 7, 10, 13, 15, and 11, presented in that order, from the male series of 1943. The TAT was always given after the Rorschach.

These social scientists have little knowledge of the TAT and there is no one among them who is expert in its scoring and interpretation. One of the psychologists and one of the anthropologists do have a considerable acquaintance with TAT theory, and the anthropologist has given, but not interpreted, the test. Seven of the psychologists and one anthropologist have read about the test or heard discussions of it, but have no technical knowledge, and the others

know nothing about the test, although a few have seen the cards around.

The TAT is difficult to handle as a research instrument, since the scoring is not well codified, but it supplements the interview material elegantly for individual analysis. As in previous studies (16, 22), I have again followed Wyatt. The basic data are presented in Tables 11, 12, 13, and 14. In all of the tables the entries in the columns are the numbers designating particular pictures. Numbers are placed in parentheses when the column heading applies to part of the story but not all of it (e.g., if the story has an unusual twist, but is not entirely unusual).

In Table 11 the first series of entries refers to the relative amounts of narration (S) and description (D). Purely descriptive responses, usually a form of noncompliance, are uncommon.

Perceptual distortions were so rare that they have not been tabulated. The columns under the heading Perception refer to details disregarded or given considerable prominence.

PSYCHOLOGICAL STUDY OF RESEARCH SCIENTISTS

TABLE II
THEMATIC APPERCEPTION TEST (TAT): SUMMARY, PART I

(Numbers in the table entries refer to TAT cards. For explanation of column headings, see text.)

Psycholo- gists	Refuse	Story			Omit	Descrip. Detail	Deviation	Past, Present, Future	Past, Present, Future	Past, Present, Future	Time Trend
		S	SD	DS							
Ps 1	all				1, 2, 4, 11	(2), 15	1, 4, 6, 7, 11	2, 10	1, 5		1, 3
Ps 2	2, 4, 6, 7, 13, 15	11	10	1	2	(4)	2, 7		1, 4	6, 10, 13, 11, 15	
Ps 3	all (10 stories)				1, 2	(4), 15	4, 11			1, 2, 6b, 7, 10, 13	
Ps 4	4, 6, 7, 10, 13, 15, 11	2	1		1	(1), 15	4, 10, 13	15	1, 2, 6, 11	7	
Ps 5	4, 6, 7, 10, 13abc, 15	2ab	11	11	1	13b, (15)	1, 13b	10	2b, 6, 13c	2a, 4, 7, 13b, 15,	11
Ps 6	all				1, (4), 7, 13	all but 10				10	
Ps 7	2, 10, 11, 13	4, 6	7	15	4						1, 4, 6, 7, 15
Ps 8	all but 11	11		1		6, 7, 10, (15), 11	1, 2, 4		6, 7, 10, 13, 15		11
Ps 9	6, 7, 15	1, 2, 4, 11	13	10	1, 4, 13	(1), 4, (6)	1, 2, 4, 6, 7, 13			10, 15, 11	
Ps 10	15	1, 4, 6, 7, 13	2, 11	10	1, 2, 4, 13, 11	(1), (7)	2, 6	13	1, 4	7, 10, 11	
Ps 11	all				1, 4, 13	(1), (6), (7), (10), (13)	1, 2, 4, 6, 7, 13, 15, 11	10			
Ps 12	all but 2	2		1		(6), (10), (13), 15, 11	all				
Ps 13	all			1	2	(6), (10)	2, 6		1, 4, 10, 13, 11	7, 15	
Ps 14	all but 2	2		1	11	11	3, 4		6, 13, 15, 11	2, 7, 10	
Anthro- pologists											
An 1		7a, 13, 15	6abc, 1, 2, 4, 7b, 10, 11		1	all	3, 5	1, 2, 4, 7b, 10, 13, 15, 11	6a, 7a		6bc
An 2	all but 2			2	1	(1), (6), (7), (10), (13, 11	6, 7, 11			1, 10, 13, 15	2, 4
An 3	all but 1b	1b		1a		10, 15, 11	4, 10	1a, 2, 6, 7, 13		11	1b, 13
An 4	11	all (8 stories)		1		3, 2, 7, 10, 15, (4), (6), (13)	1, 10, 13	7	2, 4		6, 15
An 5	4, 6, 7, 10 13, 15	2, 11		1		2	7, 13			4, 6	1, 2, 10, 15, 11
An 6	2, 6, 13	1, 7, 11	4, 10	15	2, 4	(13)	2, 13			4, 15	
An 7	all but 2	2				(2), (6), 10			1, 13, 11	2, 4, 6, 7, 10, 13	
An 8	1, 4, 6, 7, 13, 11	2	15	10	1		13			1, 2, 4, 7, 11	6, 10, 13, 15

TABLE 12
THEMATIC APPERCEPTION TEST (TAT): SUMMARY, PART II
(Numbers in the table entries refer to TAT cards. For explanation of column headings, see text.)

Psychologists	Outcome					Certainty of Outcome			Personal Reference or Opinion
	None Possible	Success	Defeat	Unsolved Tension	None or ? Given	Certain	Probable	Possible	
Ps 1		4, 11	1, 7, 15	6	2, 10, 13	1, 4, 7, 15, 11	6		
Ps 2		1, 2, 4			6, 7, 10, 13, 15, 11	2	1, 4		15
Ps 3		6a, 15			13	1, 2, 4, 6, 7, 10, 11	15	6a	6b
Ps 4		2, 6, 10	1, 4	11	7, 13, 15	1, 4, 6, 10, 11	2		
Ps 5	15	1, 6	tab	13abc	4, 7, 10, 11		1, 2, 6, 13abc		
Ps 6		1, 2, 6, 13	4, 7, 15, 11		10	1, 2, 4, 6, 13, 15, 11	7		10
Ps 7					1, 4, 6, 7, 15				13
Ps 8		1, 2, 4, 6, 7	10, 13	15	11	2, 4, 6, 10, 13, 15	1, 7		
Ps 9		1, 2, 6, 7	13	4	10, 15, 11	2	1, 4, 6, 13	7	1, 2
Ps 10		1, 2	6	4	7, 10, 13, 11	2	1, 6	4	
Ps 11		10, 11	1, 2, 13, 15	4, 6	7	10, 13, 15, 11	1, 2, 4, 6		7
Ps 12		4, 7, 10, 13, 11	2, 6, 15	1		2, 4, 6, 10, 13, 15, 11	1, 7		
Ps 13		6, 10	2	1, 4, 13	7, 15, 11	2, 4, 10	6, 13	1	
Ps 14		1, 2, 4, 6, 10, 13, 15, 11			7	6	all but 6, 7		(11)

Anthropologists

An 1		1, 2, 7b, 10, 11			6abc, 7a, 13, 15	1, 7b, 10, 11	2, 4		
An 2		1, 6, 7, 13, 11	10		2, 4, 15	1, 6, 7, 10, 13, 11			
An 3		4, 10	11		tab, 2, 6, 7, 13, 15	4, 10, 11			
An 4		2, 4, 10	13		1, 6, 7, 15	2, 4, 10, 13			1, 2
An 5		4, 6, 7			13	1, 2, 10, 15, 11	4, 6, 13	7	
An 6		10	2, 6, 13, 11	1, 7	4, 15	2, 6, 10, 13	7, 11	1	
An 7			13	1, 11	2, 4, 6, 7, 10, 15	13, 11	1		
An 8		2, 4, 7		1	6, 10, 13, 15, 11	1, 7	2	4	

Deviation refers to unusual stories. Cards 15, 11, and 10 are the ones most often entered under this heading.

Time trend is given in the last section of the table. If a subject omitted part of the time span he was asked about it but not pressed for it. The psychologists fol-

lowed instructions to give a full time span significantly more frequently than the anthropologists did (chi square was 5.57, $p < .02$), with more of the anthropologists omitting the future. About half in each group gave no past.

In Table 12, outcome of the stories

PSYCHOLOGICAL STUDY OF RESEARCH SCIENTISTS

33

TABLE I3—THEMATIC APPERCEPTION TEST (TAT); SUMMARY, PART III
 (Numbers in the table entries refer to TAT cards. For explanation of column headings, see text.)

Psychologists	Level										Tone					
	Concrete Factual	Endo-psychic	Symbolic	Mythical	Makes-believe	Conditional	Indifferent Detached Contemplat.	Cheerful Serene	Unhappy	Tense	Anxious	Morbid	Aggressive	Melodramatic	Sardonic	
Ps 1	1, 4, 7, 13, 15	2, 6, 10, 15	(11)			11	4	1, 2, 6, 7		10		13	15			
Ps 2	1, 2, 4, 6, 7, 10	15			11	13	1, 2, 10	4, 15	6	7, 13		14				
Ps 3	all includ- ing 6b						6ab, 13, 15	7, 10	1, 2, 4			11				
Ps 4	all but 11		(2), (13), (15), 11				10?	1, 4, 6		2, 7, 15, 11		13				
Ps 5	11	all but 11						2ab, 6, 10, 1ab, 15	1, 4, 7, 11	13c						
Ps 6	all but 10				10		(1, 4, 6), 2, 13	1, 4, 6, 7, 10				15	11			
Ps 7	4, 6, 7	2				Dr 15			1, 6, 7	15			4			
Ps 8	all but 15	15						6, 10	1	2, 4, 7, 15		13, 14				
Ps 9	1, 2, 4, 6, 7, 10	15	(1), (6)	11	13	(13)	2, 10	1		6	7		4, 13		15, 14	
Ps 10	1, 2, 4, 6, 7	10, 13	(4)	11			2, 10	6, 7	1	4, 13	(7)	11				
Ps 11	11	all but 11						10	1, 2, 6, 13, 15	4	(13), (15)	7	11			
Ps 12	1, 4, 6, 7, 10, 13, 15	3	11				(7), (10), (13)	2, 4, 6, 7, 10, 13, 15	1			11				
Ps 13	6, 11	1, 2, 4, 7, 10, 13, 15						10, 15	1, 2, 4, 6, 7, 13			11				
Ps 14	2	1, 4, 6, 7, 10, 15, 11			13		1, 2	15	7, 10, 11	4, 6		13				
Anthro- pologists																
An 1	7a, 11	1, 2, 4, 6abc, 7b, 10, 13, 15					1, 2, 10	6abc, 7b, b, 13			15		4, 11			
An 2	4, 6, 7, 10	13, 15	2	11		2	1	6	4, 7			10, 11			13, 15	
An 3	4, 6, 7	1ab, 2, 10, 13	(11)	15, 11		12	1b, 2	4, 6, 7			15		10, 11, 13			
An 4	1, 2, 6, 10, 13	7, 15			4								4, 13	1, 2, 6, 7, 10, 15		
An 5	2, 7, 13	1, 4, 6, 10	15	11	(6)	1	2, 15	10, 11	4, 6, 7	13						
An 6	7, 13, 11	1, 2, 6, 10	15		4			1, 2, 6, 13, 15, 11	7, 10				4			
An 7	2, 4, 6, 7, 13, 15, 11	1			10		2	15	1, 4, 6, 7, 10			13, 11				
An 8	all but 15	15					10	6	1, 2, 7, 15			4, 13, 11				

and the certainty with which the outcome is stated are recorded. Half of the stories of the anthropologists and a third of those of the psychologists do not give an outcome, or give an unclear one. In both groups a successful outcome is predicted about one third of the time. Defeat and unsolved tension make up the remainder in about equal amounts. But of the stories to which an outcome is given, the anthropologists have a higher degree of certainty in their statements. This may just mean a balancing of their greater caution in giving an outcome—they give it only when they are sure. Stories with personal references occur rarely.

In Table 13, level of the stories is recorded, as concrete-factual (C-F); endopsychic (E-P); symbolic (Sym); mythical or past (Myth); make-believe (M-B); and conditional (Co.) There are no differences between psychologists and anthropologists in these respects. Stories that are dominantly concrete-factual are a little commoner in both groups than are stories concerned primarily with what the characters are thinking and feeling. The other levels are rarely used.

General tone of the stories is also recorded in Table 13. The first column in this section includes stories scored as indifferent, detached, or contemplative; the second column, those labelled cheerful or serene. The other columns are unhappy, tense, anxious, morbid, aggressive, melodramatic and sardonic. Tones labelled unhappy, tense, and anxious are chiefly differences of degree, and incidence of stories in these groups is considerably higher for the psychologists than for the anthropologists, who have more recourse to the melodramatic and sardonic.

For the social scientists quality of stories has not been tabled, since they are

rarely scored anything but literate.

In Table 14 are given the types of personal relations described for the characters in the stories, and the nature of the process attributed to the situations. For both groups, formal relations (e.g., father, son; husband, wife) are a little commoner than emotional ones (e.g., lovers, friends). There are some differences in presses, which do not quite reach significance at the 5% level (5×2 chi square table, with chi square 9.85). The anthropologists give more unfriendly and the psychologists more internal presses.

There are a few themes that seem to recur with considerable frequency, the most evident being one of general helplessness in the face of severe problems. This is sometimes very general and sometimes seems to be limited to the male figures in the stories in contrast to the female figures. There is also a considerable feeling of dependence on parent figures, and while there are some stories of successful rebellion without serious guilt feelings, there are more stories of characters who rebelled only with guilt and general unhappiness. At the same time there are a few who seem to have a strong sense of responsibility with regard to human relations.

The details on heterosexual relations are usually fairly full. This group of social scientists is not particularly conventional in its approach but is definitely much concerned with interpersonal relations and finds it relatively easy to verbalize them.

There are some among them who find contemplation of death a serious problem. In two instances this concern with death may be a major factor in their professional activities.

TABLE 14
THEMATIC APPERCEPTION TEST (TAT): SUMMARY, PART IV
(Numbers in the table entries refer to TAT cards. For meaning of column headings, see text.)

Psychologists	Personal Relations				Presses				
	Formal	Emotional	Not Stated	None	Friendly	Unfriendly	Impersonal	Internal	?
Ps 1	1, 6	2, 4, 7, 10, 13, 11			1, 4, 6, 7	10	2, 7, 11	15	
Ps 2	2, 4, 6, 7	10, 15	13	1, 11	4, 7, 10	11	15		1, 2, 6, 13
Ps 3	2, 4, 6, 7, 13, 15	10, 11			2	6b	1, 4, 7, 13 15	6a	10, 11
Ps 4	2, 6, 7, 10, 15	4	13	1, 11	10			all but 10	
Ps 5	1, 2a, 4, 6, 7, 10, 13b, 15	2b, 13bc, 11			1, 4, 7	2ab, 6, 11	10, 13ab, 15	13c	
Ps 6	2, 4, 6	7, 10, 13, 15, 11			1	11	6, 7, 15	1, 2	4, 7, 13
Ps 7	4, 6, 7				1, 15	6	4		1, 7, 15
Ps 8	1	2, 4, 6, 7, 10, 13			15, 11	1, 7	2, 13	6, 10, 15, 11	4
Ps 9	1, 2, 6, 7	4, 15			10, 13, 11	1, 10	13	2, 15	4, 6
Ps 10	2, 6	4, 7, 13	10	1, 11	2, 4, 10	7	6	1, 13	11
Ps 11	1, 2, 10	4, 6, 7, 13, 11	15			4	7	6, 10, 11	2, 13, 15
Ps 12	1, 2, 6, 10	4, 7, 13			15, 11		15	2, 4, 6, 7, 10, 11	1, 13
Ps 13	2, 4, 6, 7, 10	13			1, 15, 11	7	11	6, 10, 15	1, 2, 4, 13
Ps 14	2, 6, 7, 15	4, 13	10	1, 11	15	4, 6, 13, 11	10	1, 2	7

Anthro-
pologists

An 1	1, 2, 6c, 7a, 10	4, 6ab, 7b, 13, 15, 11			1, 4, 10, 13	2, 15	6abc, 7ab, 11		
An 2	6, 7, 10, 15	1, 4, 13, 11			2	1, 2, 7	4, 10, 11	15	6, 10
An 3	1a, 4, 6, 7	2, 10, 13, 15			1b, 11	13, 10, 13	11	7, 15	1b, 2, 4, 6
An 4	2, 4, 6, 10, 13	1, 7			15	6, 7	1, 4, 10, 13	2	15
An 5	6, 7, 10	2, 4, 13			1, 15, 11	7	2, 10, 13, 15	6	4, 11
An 6	1, 2, 6, 10	4, 7, 13			15, 11		1, 2	4, 6, 10, 13, 11	7, 15
An 7	1, 2, 6, 7, 15	4, 10, 13			11	1, 2, 4, 7, 10	6, 13, 15, 11		
An 8	1, 2, 6, 7, 10	4, 13, 15			11	1	4, 7, 13, 11	10, 15	2
									6

COMPARISON WITH OTHER SCIENTISTS

Data on the earlier groups are recapitulated in Table 15.⁴ The average

⁴ Some minor discrepancies between the totals shown here and in the tables published in the earlier monographs are accounted for by slight changes in scoring practice; e.g., earlier, if a story seemed to fall equally well into two categories, it was entered for both; now it is entered for one only.

length of the responses to each card differs considerably, with the social scientists giving significantly longer stories ($p < .05$) than the other two groups, who do not differ materially from each other. This is in accord with the generally greater verbal productiveness of the social scientists and undoubtedly associated with the fact that more of them

TABLE 15
COMPARISON OF TAT DATA FOR THE THREE GROUPS

	Biologists		Physical Scientists		Social Scientists	
	Total number of stories.....		176 ± 1.8		169 ± 0.9	
	N	%	N	%	N	%
S or SD.....	142	81	152	90	185	93
Ds or D.....	34	19	17	10	15	7
Unusual stories.....	22	12	25	15	31	15
Unusual twists.....	37	21	30	18	31	15
Time range complete.....	23	13	46	28	74	37
Past omitted.....	129	72	92	55	105	22
Future omitted.....	69	39	84	50	83	41
Present only.....	58	33	55	33	62	31
No definite outcome.....	82	47	79	47	81	41
Success.....	54	31	54	32	67	34
Defeat.....	21	12	26	15	31	15
Unresolved tension.....	19	10	10	6	21	10
Outcome certain.....	35	37	54	60	70	59
Outcome probable.....	45	48	34	38	43	36
Outcome possible.....	14	15	2	2	6	5
Level:						
Concrete-factual.....	103	58	81	48	96	48
Endopsychic.....	47	27	62	37	82	41
Symbolic.....	8	5	8	5	5	2
Past or mythical.....	4	2	3	2	7	3
Make-believe or dream.....	6	3	9	5	9	5
Conditional.....	8	5	6	4	1	1
Tone:						
Indiff., detached, contempl.....	13	7	18	11	6	3
Cheerful, serene.....	16	9	37	22	21	10
Unhappy, tense, anxious.....	114	65	89	53	127	64
Morbid, aggressive.....	7	4	14	8	24	12
Melodramatic, sardonic.....	26	15	9	5	22	11
Personal Relations:						
Formal.....	77	44	79	46	90	45
Emotional.....	58	33	42	25	71	36
None, or not indicated.....	41	23	48	28	39	19
Presses:						
Friendly.....	44	25	40	27	43	21
Unfriendly.....	25	14	14	8	46	23
Impersonal.....	53	30	49	29	53	27
Internal.....	33	19	21	12	35	17
?.....	21	12	39	23	23	12

* Number of lines of typescript.

than of the other groups think verbally (19). The greater length of response may also reflect general testwiseness, but this is hard to check. There is practically no difference among the groups in the proportions of unusual stories or of un-

usual twists to common stories.

The full time range, which is significantly commoner among the social scientists (chi square for 3×2 table gives $p < .01$), may also be related to the social science group's willingness to verbalize

at greater length. The biologists omit the past more than the others do. Description of the card or a story relating just to the immediate moment was the only response about a third of the time in all groups. The prodding possible in usual clinical practice is clearly inappropriate with these subjects.

There are no differences among the groups with regard to outcome—the proportions are remarkably similar. But there is a marked difference with regard to the certainty with which any outcome is predicted, the biologists being significantly more restricted in this regard than the others.

In all groups the major levels are concrete-factual and endopsychic, with the biologists giving more stories characterized by the former. This accords with other aspects of their general attitudes, such as their greater interest in form on the Rorschach and their generally better emotional control, or emotional flatness. There are no marked differences in tone, in personal relations, or in assignment of pressures among the groups.

In these comparisons what is most noticeable is the great over-all similarity. However, analysis of content shows more striking differences. The biologists are the only group whose TAT protocols give any indication of particular meaningfulness to them of the paternal role.

Both biologists and physicists are much less interested in interpersonal relations generally, and more inclined to handle them in distance-getting ways than are the social scientists, although many of these are uneasy about them. But the unease is of a different sort and a manifestation of a considerable concern with such relations, rather than a dislike for them. Both biologists and physicists show a considerable independence of parental relations, and without guilt, particularly in the case of the physicists, whereas the social scientists show many dependent attitudes and much rebelliousness, accompanied frequently by guilt feelings. The attitudes of helplessness so noticeable among the social scientists are much less common in the biologists and physicists. The biologists are definitely more restrained than the other two groups in their expression of aggressive attitudes; the social scientists are the freest in this respect.

What is most striking about these results, however, is the fact that the TAT rarely gives any indication that the subject is a man of considerable attainments. Sometimes, some amount of drive is shown, but for the most part this is not very evident in the stories, nor is there any clue in them as to what has made it possible for these men as a group to have achieved as conspicuously as they have.

IX. THE RORSCHACH METHOD OF PERSONALITY DIAGNOSIS

The Rorschach was given and scored according to the directions by Klopfer and Kelley (9), and also by the Munroe Inspection Technique (13). The latter system makes the results easier to handle as a group and makes some allowance for variation in response total.

Knowledge of the Rorschach test varies in the group from none to fair acquaint-

ance. Three have read none of the literature. There are three with some scoring experience—an anthropologist who was administered and scored a great many, a psychologist who has scored a few, and one who had a 10-day course in 1941 but has never used the test. The rest have read varying amounts of the literature—usually just enough to permit them to

TABLE 16
RORSCHACH DATA

Subj.	R	M	FM	m	k	K	FK	F	Fe	c	C'	FC	CF	C	W	D	d	DR	S	P	O	T		
Ps 1	40	4	4	0	1	0	1	16	3	1	0	6	4	0	10	19	1	7	3	4	4	0		
Ps 2	38	3	4	0	0	1	0	19	2	2	0	3	4	0	8	25	4	0	1	0	1	0		
Ps 3	80	9	8	9	0	0	0	1	41	5	2	1	1	0	8	38	11	20	3	0	41	0		
Ps 4	115	6	15	3	0	1	4	6	5	3	3	4	1	2	7	49	0	32	27	8	57	0		
Ps 5	32	2	5	0	2	0	0	10	7	2	0	2	1	0	18	8	2	0	5	9	0	0		
Ps 6	92	7	9	9	3	0	0	0	35	13	3	1	6	0	0	24	39	14	14	1	0	33	1	
Ps 7	18	1	0	0	0	0	0	10	1	3	0	2	0	1	0	6	0	2	1	0	2	0		
Ps 8	36	2	8	2	0	0	0	0	15	5	0	2	1	1	0	11	22	2	1	0	6	2		
Ps 9	53	7	5	1	3	1	0	21	5	1	2	3	4	0	13	28	4	5	2	7	5	0		
Ps 10	186	7	16	16	8	1	5	5	59	24	16	2	2	13	17	1	49	65	18	46	6	9	72	0
Ps 11	67	16	12	3	2	1	3	11	5	0	3	8	3	0	9	24	8	25	1	5	23	0		
Ps 12	76	15	12	1	2	0	2	24	7	1	1	7	4	0	8	35	7	21	5	7	20	0		
Ps 13	38	6	4	1	4	0	1	7	4	0	1	4	0	0	17	17	0	2	2	0	6	0		
Ps 14	53	5	3	1	1	0	1	1	26	4	3	0	5	2	2	8	7	8	1	4	9	0		
An 1	116	7	9	3	4	0	2	67	16	0	2	3	2	1	12	46	19	36	3	0	40	11		
An 2	121	18	22	13	5	1	2	23	12	6	0	5	6	0	43	47	10	19	4	0	51	5		
An 3	105	6	12	6	4	2	0	40	15	5	1	8	6	1	19	43	18	20	3	6	25	7		
An 4	12	2	2	0	0	0	0	4	1	0	0	0	0	3	0	8	3	1	0	0	3	1		
An 5	100	5	12	3	4	0	0	30	19	2	8	6	11	0	24	42	6	18	10	7	52	11		
An 6	10	4	0	0	0	0	0	1	2	0	1	2	0	0	10	0	0	0	0	0	3	1		
An 7	45	11	6	0	0	0	0	13	7	0	0	8	0	0	8	26	5	6	0	6	8	0		
An 8	40	5	5	0	0	0	0	13	4	5	0	6	2	0	14	17	1	6	2	7	10	2		

include a brief statement, in one of their courses, about the intent of the test.

The usual test data are presented in three tables. Table 16 gives absolute values for all determinants, Table 17 percentages and various other information, Table 18 the content of the responses. The Munroe Inspection Technique data are given in Table 19.

Discussion of the results is organized around the Inspection Technique data in Table 19. Throughout the table minus entries indicate a deficiency, and plus

entries an excess of the item (the number of each indicating degree) relative to the total protocol of each individual. Excessively poor or vague forms are noted as *B* or *V*, either with respect to whole or original responses in particular, or to all responses in general. Checks indicate refusal of a card or presence of shading or color shock. Other entries are explained later. Item by item discussion obscures the interdependence of all items in interpretation; I have kept these relations in mind but to have made them

TABLE 17
ADDITIONAL RORSCHACH DATA

Subject	R	W%	D%	Dr%	F%	F1 + %	F2 + %	A%	Last	T/R	Ave.	RT	Range	d%	S%	O%	Non-F	Dom. %
Ps 1	40	25	48	18	40	94	88	45	40	18*	8*	5-19*	3	8	10	13		
Ps 2	38	20	66	0	50	90	70	42	34	?	3	3-10	10	3	5	19		
Ps 3	80	10	48	25	54	82	51	31	31	?	3	1-4	4	4	51	10		
Ps 4	115	6	35	28	56	83	70	36	34	20*	4-5	1-8	8	23	49	10		
Ps 5	53	26	25	13	31	80	72	33	27	64*	20-4	0-78	6	0	0	28	19	
Ps 6	92	20	43	16	38	80	75	33	44	22*	3-4	1-13	15	1	16	15		
Ps 7	18	33	50	16	56	100	78	33	28	33*	8-3	2-27	0	0	6	22		
Ps 8	36	10	61	3	42	93	95	47	45	30*	11-1	4-22	6	0	47	3		
Ps 9	53	24	53	11	40	95	84	35	43	50*	11-9	4-30	8	4	10	15		
Ps 10	186	26	35	10	32	83	66	23	38	19*	1	1	10	3	39	28		
Ps 11	67	13	36	37	16	100	82	27	45	42*	16-7	7-28	12	2	34	10		
Ps 12	76	10	46	88	32	80	71	35	33	32*	6-3	2-13	9	0	6	26	10	
Ps 13	38	45	45	5	18	56	50	23	50	8-0	4-17	0	5	16	26			
Ps 14	53	15	54	16	49	81	70	34	47	36*	14-2	3-27	14	2	17	13		
An 1	115	10	49	32	58	90	90	32	30	11-2	4-23	16	2	35	4			
An 2	121	35	39	14	27	79	74	31	33	13*	4-9	1-13	8	3	42	16		
An 3	105	18	41	21	39	80	70	28	35	27*	9-4	4-20	17	3	24	19		
An 4	12	67	25	0	31	100	75	33	42	25*	5-9	2-10	8	0	8	25		
An 5	100	24	42	18	30	67	77	34	44	32*	10-0	2-37	6	10	52	18		
An 6	10	100	0	0	10	110	80	10	30	90*	11-0	3-25	0	0	10	20		
An 7	45	18	58	13	29	100	92	51	40	20*	13-8	7-23	11	0	18	0		
An 8	40	35	43	15	31	100	89	31	43	37*	2-0	1-4	3	5	25	18		

TABLE 18
CONTENT IN THE RORSCHACH

Subject	H	Hd	A	Ad	AObj	Aif	Aat	Sex	Sci	Obj	Pi	N	Geo	Das	Art	Emb	Mask	Blood	Fire	Expl	Fossil	X-Ray	Cloud	Photo	Clothes	Food	Mad	Ice	Snow	Arch	? Other
Ps 1	4	3	14	4	2	2	1	0	0	3	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Ps 2	3	2	12	4	3	0	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Ps 3	6	11	20	5	3	0	3	0	1	0	19	0	22	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Ps 4	6	7	20	16	3	0	5	0	3	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Ps 5	3	5	15	5	5	1	6	1	1	6	0	5	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Ps 6	7	8	16	15	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Ps 7	3	3	14	3	2	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Ps 8	2	3	12	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Ps 9	7	5	12	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Ps 10	7	9	25	18	5	5	5	0	0	9	2	29	21	0	11	14	2	1	3	1	0	0	0	0	0	0	0	0	0	0	
Ps 11	13	6	10	9	5	5	5	0	0	1	1	6	5	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Ps 12	14	20	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Ps 13	5	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Ps 14	5	12	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
An 1	28	23	14	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
An 2	10	9	23	14	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
An 3	8	9	20	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
An 4	26	8	15	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
An 5	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
An 6	11	4	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
An 7	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

explicit in each instance would have tripled the length of this section.

Total number of responses (R) ranges from 10 to 186; the mean for psychologists is 66, for the anthropologists 69. These means are both very high, the usual total being 30 to 40 (3, 9). This group tends also to make more than usually rapid responses, time per response (T/R) averaging 33 seconds for psychologists and 39 seconds for anthropologists. Only one subject refused any card.

Location entries. There are 4 entries referring to the portion of the blot in which concepts were seen and the sequence in which these were used. Use of the whole blot is recorded as W , of unusual areas as Dd , and of white space as S . Succession (Suc) refers to the orderliness with which different areas are used. In summary there are no major differences between psychologists and anthropologists with respect to their use of locations in the blots, and a particular pattern seems to be characteristic of most of them. They produce an absolutely large, but relatively small, number of whole responses—they can deal with large concepts, can generalize adequately, if sometimes sweepingly, but are usually more interested in smaller, and less often noticed details. They are quite good observers, and tend to look at things which are not likely to strike most people. They are, however, quite casual and unsystematic in the way they go about things, sometimes to the extent of considerable disorganization in the approach. They are so productive, and so many responses occur to them so rapidly that they make no attempt to sort them out, nor do they need to rely upon any technique of procedure to stimulate further responses.

Content. This section refers to the

TABLE 19
MUNROE INSPECTION TECHNIQUE RECORD

Anthropologists																Psychologists						
	Pg 1	Pg 2	Pg 3	Pg 4	Pg 5	Pg 6	Pg 7	Pg 8	Pg 9	Pg 10	Pg 11	Pg 12	Pg 13	Pg 14	An 1	An 2	An 3	An 4	An 5	An 6	An 7	An 8
R	40	.38	.80	.116	.33	.02	.18	.36	.53	.186	.67	.76	.38	.53	116	121	105	12	100	12	45	40
T/R	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refusal																						
W		-	-	+	-	-	-	-	-	-	-	-	+100	-	-	-	-	-	-	-	-	-
Dd	+	+	++	+	+	+	+	+	+	++	++	+	++	+	+	+	+	+	+	+	+	+
S	+	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
Locat	Sec	1	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
P																						
CONT	Q		+B	+																		
At	Af				+																	
Ran	Range	+	-	t	+	t	+	t	t	+	t	+	t	+	t	+	t	+	t	+	t	+
FORM	F%																					
F	V	V	BB	BB	BV	BV																
SHADING	Shd	✓					✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓
PK, Fc																						
C																						
K, k																						
M	r	rr	db	r			--	--														
MOVE	M																					
MEN	m																					
Sm							-															
C, Sh	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FC																						
CF																						
C																						
SC																						
C, M	+	---	---	---	+	U -	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
ITS	6	9	18	15	9	13	15	13	10	15	13	13	8	9	14	14	14	11	17	16	7	7

nature of the responses, rather than to the formal aspects, to what they see, rather than how they see it. Entries are for popular responses (*P*), original responses (*O*), anatomy and sex responses (*At*), and range of types of content. (t entries indicate thematic perseverations.)

All of the social scientists give an adequate number of popular responses. A number of them tend to considerable use of original responses, about which they are likely to be rather uncritical. Anatomy and sex responses are relatively common, and are used by almost half of the group to an amount considered excessive. The range of responses is a rather curious and interesting one, since it is customarily very broad in terms of number of categories, and at the same time may show stereotyping or restrictedness of some sort. This is more often in terms of particular individual perseverations of themes, but the restriction may be in terms of excessive use of animal and human responses. The wide range would be associated with their general productivity and must also indicate a pretty general receptivity. That it does not mean an undesirable diffusion of interests would seem to follow from the fact that they are also restricted, as well as from their actual behavior. The frequent emphasis on human responses may well have vocational significance.

The content categories (human, animal, plant, geography, etc.) utilized by the two social science groups are very similar. A comparison of the number in each group using each of 26 different content categories yielded a rank correlation of + .88. The largest rank differences were for the categories food and clothes, these ranking 12th for the psychologists and 19th and 23rd for the anthropologists. Chi square for frequencies

is 5.51 for clothes and 3.44 for food; for p of $< .05$ chi square is 3.8.

Form. Form responses are those in which the concept is determined entirely by the outline of some blot area. Checklist entries refer to the relative number of these (*F%*) and to the accuracy of form for all concepts (not just those scored *F*). Form quality is an indicator of the general soundness of thinking, and more extensively of the soundness of the subject's contact with reality in general. Half of the group do not rate very high in this respect, since they receive entries for excessive use of poor or vague forms. The point may be the nature of the "reality." Psychologists are generally less concerned with what may be called external reality than they are with inner realities (e.g., motivation) and must often disregard the apparent reality and search further. (Is this rationalization?) This may be less true of anthropologists. Whatever the explanation, the fact is that social scientists are relatively unconcerned with formal qualities. This is also shown by the 15.1% average of responses which are not dominated by form. (See Table 16.)

Shading. Shading responses are those in which the tonal quality of the blots is used as texture or vista. Shock is scored when disturbances in the level or time or quality of responses appear on the shaded cards. It is supposed to indicate serious anxiety. I have suggested that it may be a reflection of an insecurity related to early failures, or loss of interpersonal relations which have been accepted or somehow coped with; and that it is not necessarily, by itself, a serious indication (see 23). It occurs in about 50% of this group and is severe in about half of those who show it at all. There are only scattered entries for excess of

any particular variety of shading responses and these are not of special importance in the group picture. These groups seem to have fairly effective techniques for handling anxiety.

Movement. Responses are scored for movement when humans (*M*), animals (*FM*), or inanimate objects (*m*) are seen in motion or in attitudes of tension. The *M* responses are supposed to indicate stabilization factors and resourceful capacities, but I think their primary meaning is simply interest in persons (or self) as persons. Excess suggests too much self-preoccupation and the quality of these responses is particularly important. (The letter entries, *B*, *r*, etc., indicate inadequacies here.) It is striking that only two psychologists and two anthropologists give optimal numbers of good *M* responses.

Some of the anthropologists start a response with free action and then tone the action down so that it becomes very restricted. This is not characteristic of this subgroup generally, and does also happen among the psychologists although less frequently. It suggests as a possible interpretation a need to repress too direct an interest in persons. Anthropology would be a good vocation for those who feel this way, since the interest in persons can be followed in a somewhat de-personalized way. To some extent, this is also true of experimental psychology.

In summary, the use of human movement in these subjects would indicate consistent interest in persons, but an interest which has been frequently restricted in some way and which is sometimes carried to extremes. The subjects tend to excess, rather than deficiency, in any movement category, but not to overall excess in the whole movement area. It is not the picture that they are generally self-absorbed, but rather that they

have considerable empathic capacity.

Color. Color entries refer to the way in which the subject makes use of color in developing his concept. Color shock is analogous to shading shock; I have found it of little significance in these groups and recent work throws some doubt on its usefulness. Color responses, generally, refer to the subject's desires for contact with other persons and his method and capacity for implementing these. In general the picture for the social scientists is a well-balanced one (*FC* is usually larger than *CF* and there are very few *C* responses). The group as a whole shows a fairly rich reactivity to immediate external stimulation, with good emotional control and without impoverishment of reactivity. In individual analysis the content of the color responses is also of importance.

The last entry in the table (*C:M*) refers to the relative numbers of responses using any color or movement. There is much greater tendency in this group to emphasis on color ("plus" entries).

The Inspection Technique Score (ITS). This measure (the total number of entries for any one person with each part of a complex entry counting as 1) is a very rough measure of adjustment. In my experience it correlates adequately with clinical adjustment of the subject rather than with social adjustment. (See reference 23 for fuller discussion.) It shows, that is, what the amount of stress has been rather than the degree of expression of it in behavioral terms. Obviously the lower the score the better the adjustment. Range in this group is 6-18, with an average of 11.4 for the psychologists and 12.5 for the anthropologists. In spite of some high scores it is clear that all of these subjects are functioning adequately, to say the least. For some of them, however, this appears to be at

TABLE 20
RORSCHACH COMPARISON AVERAGES FOR DIFFERENT SCIENTIFIC GROUPS

Entry	Biologists	Physicists	Social Scientists	Entry	Biologists	Physicists	Social Scientists
<i>N</i>	20	19	22	<i>M</i>	2.6	2.9	6.7
<i>R</i>	22.1	33.7	67.0	<i>FM</i>	3.1	3.6	7.9
<i>W</i>	8.7	9.9	15.2	<i>m</i>	0.45	1.3	3.2
<i>D</i>	9.6	14.3	28.2	<i>k</i>	0.55	0.8	1.9
<i>d</i>	1.2	2.3	6.6	<i>K</i>	0.10	0.5	0.4
<i>dr</i>	2.3	6.3	13.3	<i>FK</i>	0.10	0.5	1.0
<i>S</i>	0.2	0.9	3.4	<i>F</i>	9.7	14.3	25.5
<i>P</i>	5.2	4.9	5.8	<i>Fc</i>	2.3	2.9	7.6
<i>O</i>	4.8	6.7	21.6	<i>c</i>	0.15	0.8	2.6
<i>F%</i>	43.1	40.9	36.9	<i>CF</i>	0.75	2.9	3.9
<i>A%</i>	42.5	39.6	32.9	<i>C</i>	0	0.2	0.3
<i>F+%</i>	83.8	85.6	86.9	<i>Sum C</i>	1.8	4.3	6.7
Non- <i>F</i>							
dom%*	7.0	17.4	15.1				
<i>T/R</i>	36.0	38.9	30.8				
<i>RT</i>	16.7	14.1	8.7				
<i>ITS</i>	8.0	11.2	12.1				
Age	51.2	44.7	47.7				

quite a cost and it is this that these scores indicate.

Qualitative aspects. Perhaps the comments most frequently found in the individual analyses refer to the general productiveness of the men in these groups, to their rather uncritical attitudes, and a sort of haphazard use of rational controls—that is, that they can be rational when they wish to be but generally feel no compulsion to make a point of being so. A very great sensitivity is also extremely noticeable in almost all of the records and it usually implies a great awareness of other persons. It may sometimes result in an easy irritability, but I think more often not. In most of the protocols, there is evident fairly free aggression, which is clearer and stronger generally among the anthropologists, and more obviously oral among the psychologists. There are a number in which there seems to be a strong consciousness of hidden things, but this is not always accompanied by anxiety. Most of the subjects are fairly warm persons, but this is not always the case. Conflict over domi-

nance and authority is common. There is also evidence, particularly among the psychologists, of needing to hold and to feel nurturant attitudes.

COMPARISON WITH OTHER SCIENTISTS

The Rorschachs from these 22 social scientists can now be compared with those obtained from the 20 biologists and the 19 physical scientists previously studied. Means for each group for the various Rorschach determinants and some other data are given in Table 20.

The great difference in average number of responses between the social scientists and the others makes direct comparison for mean frequencies of little value, and most percentages are also so affected by total number of responses that they can also not be fruitfully compared. The *F + %* (the percentage of responses which are good form) and the non-*F* dominated responses (total of *mF*, *cf*, *CF*, *C*, etc.) as well as the *ITS* are not so affected. Analysis of variance of these scores gives the following results:

	<i>F</i>	<i>p</i>
<i>R</i>	13.33	<.001
<i>F+%</i>	.52	.10
non- <i>F</i> dominated %	5.84	<.01
ITS	9.58	<.001

Referring to Table 19, it appears that the social scientists are significantly more productive on the Rorschach; that the biologists use relatively fewer responses not dominated by form than the others; and that the biologists, by Munroe's measure, are definitely the best adjusted. The two latter differences are certainly related, since the nature of the adjustment shown by the biologists is one in which rational control and caution are emphasized.

In Table 21 are listed the checklist entries which show some differentiation among these groups. Only entries for which chi square has a *p* of nearly .05 or less are given. Although the checklist scoring is adjusted for length of the individual protocol, some of the observed significant differences are related to difference in length. Succession cannot be scored in short protocols, and range is more likely to be great in longer protocols. Where very few *M* are given no entry for restricted *M* (*r*) can be made.

The contrasts between physicists and social scientists in use of *W*, between the social scientists and the others in use of *M*, and between the physicists and biologists in use of *CF* do seem to be sustained by this analysis.

Differences between the scientist groups in content categories can be expressed over-all by the use of rank correlations (on 24 categories). These are: biologists-physicists + .739; biologists-social scientists + .713; and physicists-social scientists + .769. These are not high. Major differences are greater use by biologists of the categories science, animal anatomy, and abstract; by physicists of art and design and emblem; and by social scientists of clothes and food.

Some qualitative differences may be indicated also. The biologists are the least freely aggressive; the social scientists, particularly the anthropologists, the most so, and with greater likelihood of oral elements. There are great differences between the biologists and physicists in their handling of anxiety, but the social scientists show no consistency in this respect.

In the over-all picture the similarities are greater than the differences. This is

TABLE 21
COMPARISON OF CHECKLIST ENTRIES FOR DIFFERENT GROUPS OF SCIENTISTS
(3×2 tables, except as noted.)

Entry	Frequency for—			χ^2	<i>p</i>
	Biologists	Physicists	Social Scientists		
<i>N</i>	20	19	22		
<i>W+</i>	3	8	4		
<i>W-</i>	0	2	6		
<i>Suc, I or II</i>	6	7	17	11.05	<.01
<i>O+</i>	2	1	7	6.13	<.05 >.02
Range+	1	2	13	19.36	<.01
<i>P, BV</i>	3	7	11	5.76	>.05
<i>Mr</i>	6	2	10	6.00	.05
<i>M+</i>	1	0	5		
<i>M-</i>	10	9	2	17.37*	<.01
<i>CF+</i>	0	7	2	14.28*	.01
<i>CF-</i>	7	1	2		

* *W*, *M*, and *CF* are checked by 3×3 tables, the rows being +, no entry, and -.

TABLE 22
COMPARISON OF INDIVIDUAL AND GROUP RORSCHACHS OF SOCIAL SCIENTISTS

	Means		<i>t</i>	<i>p</i>
	Individual	Group		
<i>N</i>	22	129		
Age	47.7 ± 1.38	41.1 ± 0.87	4.04	<.01
<i>R</i>	67.0 ± 9.08	42.0 ± 1.65	2.60	<.01
ITS	12.1 ± 0.74	8.2 ± 0.35	4.73	<.01
<i>F</i> + %	86.9 ± 2.56	83.4 ± 1.71	1.13	>.05
Non- <i>F</i> dom.	15.1 ± 1.53	10.1 ± 0.58	3.05	<.01
Checklist Entries				
Entry	Frequencies for—		χ^2	<i>p</i>
	Individuals	Groups		
<i>W</i> —	6	10	7.56	<.01
<i>Dd</i> %	17	60	7.12	<.01
<i>O</i> +	7	0	35.76	<.01
<i>O</i> , <i>BV</i>	5	4	12.73	<.01
<i>At</i> , <i>Sex</i>	9	15	12.05	<.01
Range+	13	23	17.53	<.01
Range— or <i>t</i>	11	32	5.86	.02 > <i>p</i> > .01
<i>F BV</i>	11	37	3.94	.05 > <i>p</i> > .02
<i>C</i> : <i>M</i> +	6	12		
<i>C</i> : <i>M</i> —	2	27	7.65	.05 > <i>p</i> > .02

to be expected from the fact that there is considerable heterogeneity within the separate groups, and from the fact that these men are all functioning adequately.

COMPARISON WITH GROUP RORSCHACH STUDIES

The group Rorschach was given to 104 psychologists and 25 anthropologists, members of university faculties. A full report is given elsewhere (23) but the data for the total group are used here for comparison with the men studied individually. There is a major difference in the proportions of types of psychologists in the two groups. Among those taking the group Rorschachs there were 25 experimentalists, 33 clinicians, 27 working in social, child, and personality psychology and 19 in industrial and statistical. Some differences were found for these subgroups, but these are relatively few.

Table 22 gives comparative data from

the individual and group studies. Age difference is a result of the selection of the men for individual study. The very large and significant difference in mean number of responses makes comparison, except by the checklist, possible for only a few items. Differences in ITS and in non-*F* dominated % are significant.

Only 9 checklist items show significant differences; these, if they can be accepted at face value, would indicate that the eminent group, in addition to its greater productivity, used fewer whole and more unusual detail responses, were both more original and less controlled, produced a wider range of responses, including more anatomy and sex responses and more concept-dominated series of responses, and finally, tended to proportionately more color than movement responses. These can be subsumed under a general attitude of greater productivity and reactivity, more originality, and less control.

There is quite close correspondence in use of content categories, rho being + .88. There are no major differences among responses most commonly given, except the anatomy responses.

Comparison of eminent biologists with other biologists produced a different picture—the more eminent men had rather better controlled, if somewhat more restricted, protocols. Here the opposite is true. In the case of physicists no

important differences were found.

Comparisons on the checklist between all of the eminent men and all of those who took the group Rorschach show a few major differences which are not related to the longer individual protocols. Among these the most marked are the greater use of unusual blot areas by the eminent men, and their freer use of anatomy and sex responses and of perseverating responses.

X. DISCUSSION

The direct study of eminent men raises numerous and very difficult problems. One clearly does not have the complete freedom of a biographer writing centuries after the lifetime of the subject. But these difficulties are more than compensated for by the value of direct clinical and test data. In the first study of such a nature, much time must be spent in exploratory work and the first monograph pointed out that at this stage, "All that one can hope for in such work is to get some idea of the nature of the relationships, the points at which a direct attack can be made, and the sort of tools to use" (21, p. 1). I feel that this has been accomplished. Before explicit discussion is presented, however, something should be said about the limitations of the study.

In the first place the sample is small in absolute numbers although relatively very large. The subjects are the best research men in each field and they comprise a high percentage of the men who could be so designated. The conclusions drawn, however, apply directly only to the first-rate scientist, and only indirectly, and with some qualifications, to scientists generally. The group Rorschachs have offered useful confirmation, however.

We lack comparable groups in non-

scientific vocations. A more serious limitation is the lack of any control group of relatively unsuccessful scientists, men who had the training and appeared to have the promise, but who have produced little or not at all in research. This is the next most important step and a prerequisite to the satisfactory development of hypotheses about choice of science as a vocation and success in it. One cannot always be certain whether the situations noted in this study refer to choice of vocation or to success, or to what extent they are affected by high frequency of a middle-class socioeconomic background.

As in all research with people, the complexity of the situations encountered makes the determination of direct causal relations practically impossible. What has been accomplished, however, is not only the accumulation of test data on a hitherto practically unstudied group, but also the identification of situations which recur with high frequency.

It is evident that the family backgrounds of the 64 scientists studied are by no means randomly selected with respect to the population at large. According to census reports for 1910, only 3% of the gainfully employed men in the country were professional men. In this

group, however, 53% of the fathers of the subjects were professional men. One-eighth of the group came from farm homes; and the fathers of 31% were in business, many of them owning their own. Only two fathers were skilled laborers. None of the scientists came from homes in which the father was an unskilled laborer and none came from families of very great wealth. Cattell and Brimhall (5) in 1921 found a 51% incidence of professional fathers for the 66 leading scientists they studied.

What seems to be the operative factor here is that in practically all of these homes, whatever the occupation of the father, learning was valued for its own sake. Its concomitants in terms of possible better income or social position were not scorned, but it was rare for these to be the most important. This certainly was a major factor in the facilitation of intellectualization of interests. In my opinion this, rather than the probable associated intellectual levels, is the important aspect here. "Overintellectualization" may be a middle-class characteristic and it may interfere with libidinal development in other spheres, as some psychoanalytic writers have pointed out. Yet it seems to me doubtful whether one can develop the sort of intense personal involvement which is characteristic of these scientists without some degree of this, if a channelling of energy in one direction means a lessening of it in others. There is a serious problem here. Unquestionably overintellectualization is frequently a technique for escaping emotional problems, especially those bound up in interpersonal relationships, but it is not necessarily so. I believe it is possible to concentrate upon intellectual activities without having a relatively sterile life emotionally, but we certainly

have not developed educational techniques which foster this.

I have reported a greater than chance incidence of first-born among these eminent men. The problem of birth order is an extremely tricky matter statistically, and I would not be inclined to pay much attention to this finding in a group of 64 were it not that Cattell and Brimhall reported the same finding in a group of 855 scientists. It could be argued that the point here also is that intelligence levels are higher in the first-born, for which there is some evidence, but it seems much more probable that both of these facts are results of the same cause, whatever that is.⁵

Certain aspects of the data offer evidence on the basic importance of the need to achieve, or to keep independence, which is so well met by a career in research. There are no Catholics in the group. The Protestant churches to which all but five of the scientists' families belonged have varying degrees of insistence on the authority of the church over its members' interpretations of life, but all but three of these subjects have dismissed organized religion as a guide and usually had done so by late adolescence. In this respect, also, they have achieved independence. The dearth of Catholics in research science is corroborated in other studies (11, 29) and the Wesleyan survey found that production of scientists from

⁵ Two hypotheses come to mind. One is that first-born are likely to be overprotected, especially in families where social status is important. These men, then, may be compensating in terms of seeking greater independence. The other hypothesis is that eldest sons may have more responsibility for themselves and have it earlier than is the case for other children; they also have been spared the discouragement of not being able to compete with those just older. Hence they are just continuing an early pattern of independence.

Catholic institutions is uniformly low (10).

In the life histories of many of these men there are factors which indicate a feeling of apartness from others which takes different forms and seems to have a number of different causes. Ten of these men suffered the death of a parent before they were 10 years old, 7 others in their teens. Among most of those whose loss occurred early, this was apparently a factor in the acceptance of isolation. For several of these men, this early loss appears to have had an indirect effect upon vocational choice. There may have resulted an intensified problem over the acceptance of the inevitability of death. Study of life processes and study of ancient civilizations (reassuring in the continuity of mankind if not of a man) may be a technique, and an effective one, for coping with this. But not every biologist has strong death fears, nor is every archeologist concerned with survival problems.

Among the theoretical physicists, there was a very high incidence of severe childhood illnesses which certainly contributed to isolation.⁶ It was only among the social scientists that this feeling of apartness characteristically carried a tone of superiority. With the other groups it appears to be sometimes inferior, but char-

⁶I should like to offer the suggestion that there may be a hint here as to how the theoretical physicist is able to divorce his conception of size from any relation to the body image. In view of the fact that the physicist may be dealing with galaxies one day and atoms another, it is clear that the concept of size must be a completely abstract one, and I have some direct interview material to this effect. Since, however, for most persons, size is directly related to the body image, some explanation is needed for being able to get away from this. It is possible that a very unsatisfactory body image might have resulted from the early illnesses, and this very unsatisfactoriness made it easier to discard it.

acteristically neither. It is a related fact that the social scientists do not show the type of psychosocial development characteristic of the other groups—that is, a pattern of general avoidance of intimate personal contacts, a considerably later than usual development of heterosexual interests, or at least of their expression, and even at the present time, a decided preference for a very limited social life.

The biologists and physicists show a considerable present independence of parental relations, and without guilt for the most part. This has also been noted in business executives (8). The social scientists, on the other hand, are much less free of parental ties, in the sense that a number of them still harbor resentment and rebellion, even though they have achieved an outward independence. It is more than possible that this difference is a major factor in the choice of vocation. An unresolved conflict over parental relations could as easily be displaced to a concern with personal relations generally, as an unresolved conflict over death could lead to study of living processes.

More of these men than not, as boys, pursued rather independent paths—playing with one or a few close friends, instead of with a gang, following their own particular interests (shifting or not) with somewhat more than the usual intensity. There are some to whom this does not apply, but it is fairly characteristic, and such interests were more often intellectual than not, except among the experimental physicists and biochemists. It is, of course, true that their high level of intelligence would, in itself, have some of these effects.

There is no one general pattern by which they approached science as a career. The modal age at which the decision was made was during the last

two undergraduate years, but in some cases it was made in early childhood or as late as the second year of graduate work. The introduction may have been through natural history interests, through gadgeteering, through interest in laboratory sciences as found in high school courses, or, for the social scientists, through dissatisfaction with literature as a means of studying the behavior of people, or through a service motivation. When the decisive point can be determined it was usually the discovery of the possibility of doing research, of finding out things for oneself. For some this was understood very early—as with those experimental physicists who spent much of their childhood playing with erector sets, radios, and all the other sorts of equipment that permit manipulation and construction. For others, it came as a revelation of unique moment. Once it was fully understood that *personal* research was possible, once some research had actually been accomplished, there was never any question. This was it. The educational implications are obvious enough. There has been no question since. From then on, absorption in the vocation was so complete as seriously to limit all other activity. In the case of the social scientists, at least for those for whom people themselves provide the data, this did not limit social participation; for the others it intensified an already present disinterest. Although a few of them have cut down somewhat on their hours of work as they have grown older, it is still the common pattern for them to work nights, Sundays, holidays, as they always have. Most of them are happiest when they are working—some only when they are working. In all these instances, other aspects—economic return, social and professional status—are of secondary importance.

Being curious plays a major role—a trait which many aspects of our educational practice tend to discourage. It is of crucial importance that these men set their own problems and investigate what interests them. No one tells them what to think about, or when, or how. Here they have almost perfect freedom. Their limitations are only those of equipment and time, and the limitations of their own understanding. (It is certainly true that the free flow of their work can be inhibited by emotional problems, but I believe that this could be dealt with directly. It would be worth while to try.) Certainly this is one vocation in which man can most nearly approach what he can be, and one that satisfies both autonomous and homonymous drives (1).

That the need for this sort of independence is one with deep roots can be seen in situations remote from that of research science. It is clear from the report of the Michigan survey (28); it is made most abundantly clear in the studies of client-centered therapy, of student-centered teaching, and in the varied studies from the Tavistock Institute (25). It is, I think, precisely the sort of independence that democracy alone can provide.

The position these men have reached has not been reached easily, and one must ask why this particular group has made so great an effort. It must be noted that this effort has usually been directed quite specifically toward the immediate problem rather than to a long-term goal of eminence. There is some evidence that a basic insecurity of perhaps more than the usual proportions is present in many, if not most, of this group, but the causes for this insecurity appear varied. (This would tend to support the hypothesis that the need for independence in this group is generally compensatory.) That

intellectual channels were sought to alleviate it must be in large part because of the family background, but there is no question that the research aspect is of more importance than the general intellectualization.

The question also arises as to why one subject chose one field of science and others chose other fields. Apart from the often overlooked matter of necessary contact with the field, there is some further evidence from the study. The problem of coping with early affectional loss has been mentioned. It would also appear that there are some, particularly among the experimental physicists, who seem early to have formed direct relationships with objects rather than people, not compensatorily. In others, a generalized anxiety, of unknown cause, and possibly only an exacerbation of normal anxiety, is alleviated by concentration on a particular field. For example, I know biochemists who seem to me to live in a very dangerous world—they are always conscious of the presence about them of dangerous micro-organisms. They tolerate this in part because they are able to manipulate these organisms to some extent professionally. I am sure, however, that to them psychologists live in an equally dangerous world, surrounded by irrational emotional people, a situation which they would find quite intolerable.

The social scientists stand apart as having been more concerned at an earlier age, about personal relations (or as being willing to tolerate this concern as such, without translation). This may reflect an unconscious uncertainty over the consciously felt superiority that characterized half of the psychologists and most of the anthropologists. It is also certainly related to their difficulties in freeing themselves from their parents. The other groups seem to have been

able, fairly early, to work out an adaptation not nearly so dependent upon personal relations, but rather strikingly independent of them. Certainly psychology to some extent, particularly social psychology, and anthropology to a large extent, particularly cultural anthropology, offer an ideal vocation to the person whose conviction of personal superiority is not accompanied by asocial characteristics; they permit a somewhat Jovian survey of their own society as well as others, and maintain the social scientist in a state of superiority just because he is able to make the survey. (This accounts nicely for the observation that some rather paranoid indications in the test material are not accompanied by forms of paranoid behavior, except perhaps as regards their own colleagues.) The experimental psychologists are generally less concerned with people as people, although this is by no means true of all of them. The further observations that a conflict over dominance and authority is common in the group, and that in a number of their homes the mother was dominant indicate the possibility of difficulties in achieving masculine identification.

In this respect it would seem very probable that the physicists, particularly the experimentalists, were able to identify more easily with their fathers than the other groups and hence to follow comfortably a science which has rather more of a "masculine" tinge in our culture than the others do.

It must be pointed out that it is likely that the kind of person who has gone into social science may have had a biasing effect on the theories produced by social scientists, particularly with regard to the desirable or the mature personality. Practically all current psychological theory of development stresses strongly

the central importance in any life of the richness of personal relations as a basis for "adjustment." But the data of this study demonstrate, and it seems to me quite conclusively, that a more than adequate personal and social adjustment in the larger sense of an adjustment which permits a socially extremely useful life and one which is personally deeply satisfying, is not only possible, but probably quite common, with little of the sort of personal relations which psychologists consider essential. Many of the biological and physical scientists are very little concerned with personal relations, and this is not only entirely satisfactory to them, but it cannot be shown always to be a compensatory mechanism (nor are compensatory mechanisms necessarily undesirable).⁷ It can also apparently be satisfactory to others who are closely associated with them. That divorces are so much commoner among the social scientists is of interest in this connection. Problems with masculinity and dominance must be important here; but also, where much more attention and emotion are invested, demands are certain to be greater and more specific, and hence failure commoner.

Another finding of considerable importance is the differences of imagery which are associated with the different fields of science, and which accord with and perhaps explain some of the test data.

⁷The fact that a satisfactory life has been achieved on this basis does not mean that a more satisfying one could not be achieved. It is, indeed, a great pity that so many men have less rich lives than they might, but again, I speak from the standpoint of a psychologist. It is, however, probable that a concentration which is basically neurotic will also limit the possible breadth of vocational activity and it will frequently interfere, in the long run, with the man's enjoyment of his vocation, as is witnessed by the not infrequent depressions experienced in the face of the greatest recognition.

Briefly, the biologists and experimental physicists tend strongly to dependence upon visual imagery in their thinking; the theoretical physicists and the social scientists, to dependence upon verbalization or similar symbolization in theirs. Nothing is known about the development of these modes of thinking, but it seems probable that they were developed early (they are associated with father's occupation) and played a part in the choice of a science. Further, it was shown that those scientists whose preferred mode of thinking differed from that characteristic for their science also differed in some aspects of their early history, and in the things they did or the ways they went about their work. (This is good reason for not using such a factor selectively—their contributions have a special place.) The domination of the formal qualities of the blots in the biologists' Rorschachs, which the others do not show, is in accord with this, as is the generally much more fluid verbalization of the social scientists.

Doubtless, also, some intellectual factors enter. So far as the test used is a measure of these, it is clear that the theoretical physicists surpass all other groups on both verbal and spatial tests. The experimental physicists are high on the spatial and relatively very low on the verbal test. Psychologists are at about the mean for this total group on all three. Anthropologists are high on the verbal and lowest on both spatial and mathematical. These patterning are probably of importance in selection of vocation—particularly the relatively low nonverbal abilities of the anthropologists and the relatively low verbal ability of the experimental physicists.

I suspect that the verbalization so characteristic of the social scientist has also exerted some bias on his activities. This

is probably most obvious in the field of testing where the emphasis still remains on verbal tests, although other tests have come into general use. But psychologists, and educators who are probably much like them in this respect, are in a position which makes possible the operation of this bias to keep out of college many adolescents who are verbally inept but have other capacities of equal value to society, and for whom college could be important. This bias may have affected the development of techniques of teaching and of therapy. The effect in the first is obvious. In therapy it may well be a factor in the common insistence on verbalization of insights as essential to therapy.

That verbalization and intense interest in persons are related has long been noted peripherally. This relation is accompanied by some cultural sex differentiation. Girls test higher verbally than boys; the M-F (or masculinity-femininity indexes) for certain occupations which have culturally a strongly feminine tinge are very different from those with a culturally strongly masculine tinge, and these are also associated with verbalization. See, for example, Table 29 in Strong (27). Quite likely the development of verbalization is higher among those interested in persons, because it is the chief means of communication.

The range of test intelligence in this group is also of importance. All of the evidence confirms Cox's remark: ". . . high, but not the highest intelligence, combined with the greatest degree of persistence, will achieve greater eminence than the highest degree of intelligence with somewhat less persistence" (6, p. 187). Portenier noted that "It would seem then that while there is a positive correlation between psychological test ratings and honor awards, the

honor recipients are not limited to students with high psychological tests scores, and many students who make high test scores fail to win honors" (14, p. 499). Clearly a certain degree of intelligence is a necessary condition for a career in research science, but it is not a sufficient one.

The strength of the achievement drive which these men have shown is rarely reflected in the TAT in any direct way, and there are a number of Rorschachs which give no indication that the subject is capable of great accomplishment. Indeed there are a number of subjects for whom none of the test material would give the slightest clue that the subject was a scientist of renown.

There are Rorschach protocols which would occasion no surprise in a clinic for the maladjusted. It is certainly true that those who work only with persons whose lives show considerable disruption seem to have no idea of the extraordinary range of tolerance of difficulty which "normals" show. A number of these men are particularly good examples. It should also be pointed out that for many of these subjects, the career itself has served as a technique for handling the personal problems. In some instances the basic problem has been, in a sense, extrapolated into a more general one, and the subject has then settled down to working on the general problem. This is a very neat and effective method. In other instances, absorption in the career has made possible the encapsulation of the difficulty in such a manner that it can be almost ignored by the subject. The price he may pay for this is another matter. There is nothing in these data to suggest that any measure from these or other projective techniques, or from intelligence tests, would be nearly so adequate in predicting their success as

the fact that they worked long hours in graduate school, many more than the course requirements, and that they preferred to work on their own. (But I do not know how many less successful scientists have worked hard and preferred independence.)

Nevertheless the tests have contributed materially to our understanding of what sort of men these scientists are, and have also offered essential clues as to how and why they have become what they are. These now can be followed up in more direct fashion.

It would seem that nearly all educational systems tend to stultify any attempt to learn how to do things or to learn things for oneself. It is much easier to teach dogmas, of whatever variety, to require only rote learning (instead of only so much as is actually necessary as a tool), and to forget that even our tools are only conventions. It is easy to penalize independent thinking. (How much have our "rapid check" tests, helped in

this?) It is easier to give assignments in terms of so many pages to be read than in terms of problems to be solved by whatever means can be found. The point is crucial, and it is as important in the elementary and high schools as in college.

Most of these subjects were fortunate enough somewhere along the line to have found a teacher who induced them to find things out for themselves, or who let them do so, or who insisted that they do so because he did not want to be bothered. Once intellectual independence was really tasted, nothing else mattered much pedagogically; bad teaching then was only an irritation. But how many are there who have never learned to rely upon themselves, to find how valid their own thinking may be? Certainty of his own worth is any man's greatest need. Though some of them may find it only there, scientists do find this certainty in science.

XI. SUMMARY

This monograph has presented the life history and test data of 14 eminent psychologists and 8 eminent anthropologists, and compared them with the biologists and physicists previously studied. This summary will omit the comparative material.

Selection was by peer ratings of men presently doing research. Average age is 46.7 for the psychologists, 49.4 for the anthropologists. The majority of both groups came from lower to upper middle-class backgrounds. The economic level was generally higher for the anthropologists. The fathers of half of the psychologists and of three of the anthropologists were professional men.

All of the subjects are married and most of them have children. Average

age at marriage was 26.5 for psychologists and 26.1 for the anthropologists. Five of the psychologists and four of the anthropologists have been divorced at least once.

They received their B.A.'s at an average age of 21.4 for psychologists, 22.1 for anthropologists; their Ph.D.'s at an average age of 25.8 for psychologists, 28.6 for anthropologists.

Early interest in literature and the classics was common among both groups, and there were a few with early natural history interests. The psychologists were relatively late in determining upon a profession, largely because psychology was not taught in high school or early college.

Among both groups, particularly the

anthropologists, early feelings of personal or family superiority on a social or intellectual basis were common. Patterns involving overprotection and firm, if not overt, control were frequent, and strong rebelliousness was usual. A number of the subjects still show resentment over family discipline or interference.

All but two of the men came from Protestant homes, none from Catholic homes, and most had some religious training. Only two are now interested in church.

Average raw scores on the verbal test were 57.7 for psychologists, 61.1 for anthropologists. On the spatial test they were 11.3 and 8.2 respectively, and on the mathematical 15.6 and 9.2.

On the Thematic Apperception Test both groups gave relatively long stories, and manifested generally a similar picture. A common theme is of general helplessness in the face of severe problems. There is considerable dependence on parent figures, and a number of stories

of unhappiness and guilt with regard to this relation. The group is strongly concerned with interpersonal relations, fairly free in discussing heterosexual ones, and not particularly conventional.

On the Roschach the social scientists are remarkably productive, rather uncritical, and somewhat haphazard in their use of rational controls. They are very sensitive, intensively concerned with persons, rather freely aggressive, and often troubled with conflicts over dominance and authority.

The group Rorschach records of 129 other psychologists and anthropologists have a much lower average number of responses and a significantly better adjustment score. The eminent group used less *W* and more *Dr*, were both more original and less controlled, produced a wider range of responses, including more anatomy and sex responses, and more concept-dominated series of responses, and tended to proportionately more color than movement.

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